**EPA/ROD/R04-01/566**
**2001**

# EPA Superfund
# Record of Decision:

**CAMP LEJEUNE MILITARY RES. (USNAVY)**
**EPA ID: NC6170022580**
**OU 10**
**ONSLOW COUNTY, NC**
**09/28/2001**

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Final

# Record of Decision
# Operable Unit No. 9
# (Site 65)

## Marine Corps Base
## Camp Lejeune, North Carolina

**Prepared For**

## Department of the Navy
### Atlantic Division
### Naval Facilities Engineering Command

**Norfolk, Virginia**

Contract No. N62470-95-D-6007
CTO-0130

August 2001

**Prepared by**

CH2M HILL
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Federal Programs Corp.

# TECHNICAL REVIEW SIGNATURE PAGE

Revised Draft

Record of Decision for
Operable Unit No. 9 (Site 65) at
Marine Corps Base, Camp Lejeune, North Carolina

Contract Task Order Number - 0130
Contract Number N62470-95-D-6007
Navy CLEAN II Program

*Prepared by*

BAKER ENVIRONMENTAL, INC

Coraopolis, Pennsylvania

June, 2001

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## LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ARAR | Applicable or Relevant and Appropriate Requirements |
| Baker | Baker Environmental, Inc. |
| bgs | below ground surface |
| CERCLA | Comprehensive Environmental Response, Compensation and Liability Act |
| COPC | contaminant of potential concern |
| CT | central tendency |
| DoN | Department of the Navy |
| FS | Feasibility Study |
| ft/ft | feet per foot |
| gpm | gallons per minute |
| HI | hazard index |
| IAS | Initial Assessment Study |
| ICR | incremental cancer risk |
| LANTDIV | Naval Facilities Engineering Command, Atlantic Division |
| MCB | Marine Corps Base |
| MCL | Maximum Contaminant Level |
| msl | mean sea level |
| µg/kg | micrograms per kilogram |
| NC DENR | North Carolina Department of Environment and Natural Resources |
| NCP | National Contingency Plan |
| NCWQS | North Carolina Water Quality Standards |
| OU | operable unit |
| PAH | polynuclear aromatic hydrocarbons |
| PCB | polychlorinated biphenyl |
| POL | petroleum, oil, and lubricant |
| PRAP | Proposed Remedial Action Plan |
| PRG | Preliminary Remediation Goal |
| QA/QC | quality assurance/quality control |
| RA | risk assessment |
| RAB | Restoration Advisory Board |
| RBC | Risk Based Concentration |
| RI | Remedial Investigation |
| ROD | Record of Decision |
| SARA | Superfund Amendments and Reauthorization Act |
| SI | Site Inspection |
| SSL | soil screening level |
| SSSV | surface soil screening value |
| SSV | sediment screening value |
| SVOC | semivolatile organic compound |
| SWSV | surface water screening value |

| | |
|---|---|
| TBC | to-be-considered |
| USEPA | United States Environmental Protection Agency |
| VOC | volatile organic compound |
| WAR | Water and Air Research, Inc. |

# DECLARATION

## Site Name and Location

Operable Unit No. 9
Site 65
Marine Corps Base (MCB)
Camp Lejeune, North Carolina

## Statement of Basis and Purpose

This document presents the selected remedy for Operable Unit (OU) No. 9 (Site 65) at MCB, Camp Lejeune, North Carolina. OU No. 9 was originally comprised of two sites, Sites 65 and 73, because of their geographical proximity. Because groundwater contamination exists at Site 73 that will require an active remedy, these sites were separated into different OUs. Accordingly, this decision document has been prepared to address only Site 65. The selected remedy for Site 65 was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document is based on the Administrative Record for OU No. 9, Site 65.

## Assessment of the Site

The lead agency has determined that no action is necessary at OU No. 9 (Site 65) to protect public health and welfare or the environment from actual or threatened releases of pollutants to the environment.

## Description of the Selected Remedy

The selected remedial alternative for OU No. 9, Site 65 is No Action. This alternative involves taking no remedial actions at this site. The environmental media will be left as they currently exist at the site. No institutional or engineering controls will be implemented. Five-year reviews are not required for this site because it has been determined that constituents at the site are present at levels that will allow for unlimited use and unrestricted exposure to site environmental media.

## Statutory Determinations

The United States Environmental Protection Agency (USEPA) believes that the No Action decision is justifiable, as the present conditions at OU No. 9 are protective of human health and the environment. No remedial action is necessary at Site 65 to ensure this protection. The North Carolina Department of Environmental and Natural Resources has reviewed and concurs with the No Action decision. A concurrence letter from the NC DENR is presented in Appendix A.

## Data Certification Checklist

The following information is included in the Decision Summary sections of this Record of Decision (ROD). Additional information can be found in the Administrative Record file for this OU.

- Chemicals of potential concern and their respective concentrations from the environmental investigations conducted at this site are discussed in Section 5.7.
- The quantitative human health and ecological risk assessments conducted for Site 65 are summarized in Sections 7.1 and 7.2, respectively.
- Cleanup levels were not established for Site 65 because no remedial actions are required.
- There are no source materials constituting a threat at this site. The environmental media will be left as they currently exist.
- No restrictions apply to land or groundwater use at this site.
- The No Action decision for Site 65 is evaluated using USEPA criteria as described in the Decision Summary section.
- The No Action alternative requires no capital or annual operation and maintenance costs. No Action will be effective upon approval of this ROD.

D M Mize — 25 SEP 2001

Major General D.M. Mize — Date
Commanding General
Marine Corps Base, Camp Lejeune

James D Kutzman for — 9/28/01

Richard D. Green, Director — Date
Waste Management Division
U.S. Environmental Protection Agency – Region 4

9-26-01

Dexter Matthews, Interim Director — Date
Division of Solid Waste Management
North Carolina Department of Environment and Natural Resources

## DECISION SUMMARY – OU No. 9

This Record of Decision (ROD) document presents the final remedial action plan selected for Operable Unit (OU) No. 9 (Site 65) at Marine Corps Base (MCB), Camp Lejeune, North Carolina. The environmental media at this site were investigated as part of a Remedial Investigation (RI) (Baker, 1997) and Post-RI sampling (Baker Environmental, Inc. [Baker], 2001a). Based on the results of the RI, a No Action alternative was identified as the preferred alternative for Site 65 in a Proposed Remedial Action Plan (PRAP) document (Baker, 2001b). The public was given the opportunity to comment on the RI and PRAP. Based on comments received during the public comment period, and any new information that became available in the interim, a final remedial action plan was selected for OU No. 9 (Site 65).

This ROD document presents the final selected remedy along with a summary of the remedy selection process. The selected remedial action alternative for OU No. 9 (Site 65) is No Action. No Action was the only alternative considered for this site because the extent and level of contamination was not significant enough to warrant remedial action. It should be noted that there have been no enforcement activities conducted or required for OU No. 9. With the signing of this ROD, Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) requirements for this OU will be satisfied.

## 1.0 SITE NAME, LOCATION AND DESCRIPTION

OU No. 9 is one of 21 OUs located within MCB, Camp Lejeune. Figure 1 depicts the location of OU No. 9 within MCB, Camp Lejeune. As shown, OU No. 9 is located within the southern portion of the Base.

Figure 2 presents a site map of Site 65, the Engineer Area Dump. Site 65 is primarily a wooded area located immediately west and north of the Marine Corps Engineer School, which occupies property between Site 65 and Courthouse Bay. The school is used for maintenance, storage, and operator training of amphibious vehicles and heavy construction equipment. The school also utilizes a several acre parcel located just east of Site 65 to conduct heavy equipment training activities. Two ponds, Courthouse Bay Pond and Powerline Pond, are located east of the Heavy Equipment Training Area.

## 2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

Site 65 reportedly was used for waste disposal from 1952 to 1972. Two separate disposal areas were originally reported including: (1) a battery acid disposal area; and (2) a liquids disposal area where petroleum, oil, and lubricant (POL) products were reportedly disposed. There are no historical maps or figures which depict the location of the disposal areas, and neither area is currently discernible due to heavy vegetative growth. Base maps are available which indicate the location of a former burn area (Figure 2). Like the disposal area, the location of the burn area is not currently discernible from the surrounding landscape. Historical aerial photographs depict disturbed areas east of the Engineer School, which represent perhaps the best available means for approximately locating the site.

No enforcement activities have been conducted or required to date at Site 65. Previous investigations conducted at Site 65 include an Initial Assessment Study (IAS) (Water and Air Research, Inc. [WAR], 1983), a Site Inspection (SI) (Baker, 1994a), an RI (Baker, 1997) and Post-RI sampling (Baker, 2001a). The following paragraphs briefly describe these investigations.

## 2.1 Initial Assessment Study

In 1983, an IAS was conducted at MCB, Camp Lejeune. The IAS evaluated the potential hazards at various sites throughout the facilities, including Site 65. The evaluation included a review of historical records, aerial photographs, inspections, and personnel interviews. Sampling of environmental media was not conducted. The IAS concluded that Site 65 did not require further confirmation; however, a decision to perform an SI was subsequently made by the Department of the Navy (DoN) in 1991.

## 2.2 Site Inspection

The SI was conducted for Site 65 in July and August, 1991. The SI consisted of the following field activities: the installation of three shallow monitoring wells; the advancement of five, 15-foot deep soil borings; the collection of soil samples from each soil boring; groundwater sampling; and the collection of three surface water/sediment samples from two on-site ponds and an adjacent marshy area. Contaminants detected during the SI included metals and pesticides in groundwater; low levels of polynuclear aromatic hydrocarbons (PAHs) and pesticides in surface soil; low levels of pesticides and polychlorinated biphenyls (PCBs) in subsurface soil; metals in surface water; pesticides and metals in marsh sediment; and phenolic constituents in pond sediment. Based on the findings of the SI, an RI/Feasibility Study (FS), including a human health and ecological Risk Assessment (RA), was recommended to further evaluate the nature and extent of soil, sediment, surface water, and groundwater contamination. Also, further characterization of upgradient and downgradient surface soil, evaluation of debris piles, and surface water, sediment, fish, benthic community and groundwater sampling was recommended.

## 2.3 Remedial Investigation

From April 3 through May 25, 1995, an RI was conducted at Site 65. The RI consisted of the following field activities: a soil investigation; a groundwater investigation; surface water and sediment, and ecological investigations. The findings of the RI are presented in Section 5.0 of this document.

## 2.4 Post-RI Sampling

Surface and subsurface soil, sediment, surface water, and groundwater samples were collected on April 25, 27, and 29, 2001 to evaluate potential site impacts from a newly discovered (January 2001) pile of discarded drums. The findings of this sampling event are also presented in Section 5.0 of this document.

## 3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The PRAP document for OU No. 9 was released to the public on July 11, 2001. This document is available in an administrative record file at information repositories maintained at the Onslow County Public Library and at the Installation Restoration Branch Office (Building 58, MCB, Camp Lejeune). This document was made available to the public at the information repositories maintained at the Onslow County Public Library and the MCB Camp Lejeune Library.

A public comment period regarding OU No. 9 was held from July 11, 2001 through August 10, 2001; and a public meeting was held on July 18, 2001. An advertisement for the public meeting was published in the Jacksonville Daily News on July 18, 2001. During this public meeting, representatives from the DoN and the Marine Corps discussed the preferred remedial action under consideration. Community concerns were also addressed during the public meeting.

Community comments regarding the preferred remedial action, and the response to the comments received during the noted comment period are included in the Responsiveness Summary section of this ROD.

## 4.0 SCOPE AND ROLE OF RESPONSE ACTION

No Action is the selected response action for OU No. 9, Site 65. The No Action decision is the final recommended action for OU No. 9, Site 65. This decision is based on the findings of the RI field investigation, along with the results of the baseline human health and ecological RAs. In addition, justification of this decision is based on evaluation of the No Action alternative with respect to the USEPA criteria for evaluating remedial actions and remedy selection. Evaluation of the No Action decision with respect to each of the criteria is presented below. Table 5 provides a glossary of the USEPA evaluation criteria.

**Overall Protection of Human Health and the Environment:** The No Action alternative is protective of human health and the environment because site-related contaminant concentrations are generally below, or only slightly exceed, screening criteria considered protective for residential land use. In addition, exceedances are not prevalent and do not impact a large area of the site.

**Compliance with ARARs/TBCs:** Applicable or relevant and appropriate requirements (ARARs) for groundwater are North Carolina Water Quality Standards (NCWQS) and Federal Maximum Contaminant Levels (MCLs). Risk-based concentrations (RBCs) for soil and groundwater, and soil screening levels (SSLs) for soil are criteria to be considered (TBCs). Surface water data was compared to USEPA Water Quality Criteria for human health (water and organism consumption). Sediment data was compared to average upstream sediment concentrations from the White Oak River Basin Study. A comparison of site data to ARARs/TBCs is presented in Section 5.7 and in Tables 1 and 2.

**Long-Term Effectiveness and Permanence:** Because of the isolated occurrences and generally low concentrations of site-related contaminants, the No Action alternative will be protective of human health and the environment over the long term.

**Reduction of Toxicity, Mobility, or Volume through Treatment:** No treatment is required at this site to protect human health and the environment.

**Short-Term Effectiveness:** The No Action decision is protective to human health and the environment in the short term because no action is required to be protective.

**Implementability:** No Action is easily implemented.

**Cost:** No costs will be incurred with implementation of the No Action alternative.

## 5.0 SITE CHARACTERISTICS

### 5.1 Conceptual Site Model

Conceptual site models were developed for human and ecological receptors for the RI report. These models identified all potential exposure pathways via all media and the likelihood that an exposure would occur given site conditions, contaminant migration pathways, land use patterns, etc. The models for human and ecological exposure are presented on Figures 3 and 4, respectively.

### 5.2 Topography and Surface Features

The generally flat topography of MCB, Camp Lejeune is typical of the North Carolina Coastal Plain. Elevations on the Base vary from sea level to 72 feet above mean sea level (msl). The elevation of Site 65 is between 20 and 40 feet msl.

Site 65 is situated in a topographically high area that is gently pitched to the south-southeast with an average elevation of about 40 feet above msl. Due to the sandy surface soils, there is relatively little storm water runoff. The limited surface water runoff tends to drain radially to the east, south, and west, away from the site or collect in local surface depressions. Immediately east of Site 65 is the equipment training area which occupies the area between Site 65 and two small ponds located to the southeast. Portions of the area surrounding the ponds are marshy.

### 5.3 Geology

Subsurface soils encountered during drilling at Site 65 are representative of undifferentiated and River Bend Formations. Numerous borings were advanced within the study area during the field investigations conducted by Baker. Soil conditions are generally uniform throughout the study area. In general, the shallow soils consist of unconsolidated deposits of sand and silty sand. These soils represent the Quaternary age "undifferentiated" deposits which overlay the River Bend Formation.

Underlying the previously described soils is a loose to medium dense, greenish gray, fine sand containing little clay (approximately 10-35%) and trace silt. This soil unit constitutes the Belgrade Formation in the semi-confining unit separating the Quaternary sediments from the

Castle Hayne aquifer. The semi-confining unit appears to be approximately 7.5 to 15 feet thick, generally thickening toward the north. Beneath this unit resides the River Bend Formation. Borings were only advanced 10 to 15 feet into this formation during the RI, therefore providing limited knowledge of specific details regarding the condition of the River Bend beneath the study area. The upper portion of the River Bend was described as a partially cemented, gray, fine sand with some shell fragment and limestone fragments encountered periodically.

## 5.4 Hydrogeology

Hydrogeologic characteristics in the vicinity of the site were evaluated by reviewing existing information and installing a network of shallow and deep monitoring wells.

Groundwater was encountered at varying depths during the drilling program. This variation is primarily attributed to topographical changes. In general, the groundwater was encountered between 7.5 and 11 feet below ground surface (bgs) during field activities performed at the site.

Three rounds of groundwater level measurements were obtained on April 20, 23 and August 21, 1995, from the shallow and deep monitoring wells within the study area. Groundwater contours for the surficial aquifer are depicted on Figure 5. The data indicates that the groundwater flow is toward the south-southwest, with an average gradient of $9.7 \times 10^{-3}$ ft/ft. The southwestern portion of the site has a steeper gradient (an average of $1.2 \times 10^{-2}$ feet per foot [ft/ft]) than the rest of the site (an average of $8.2 \times 10^{-3}$ ft/ft).

Groundwater elevations and flow patterns for the upper portion of the Castle Hayne aquifer are depicted on Figure 6. Given the limited number of points, groundwater flow direction and gradient is estimated to flow in a southern to southwestern direction with a gradient of $2.3 \times 10^{-03}$ to $2.7 \times 10^{-03}$ ft/ft.

## 5.5 Identification of Water Supply Wells

Five active groundwater supply wells are located within a one-mile radius of Site 65 (BB44, BB47, BB218, BB220, and BB221). All of the water supply wells utilize the Castle Hayne aquifer. The Castle Hayne aquifer is highly permeable, semi-confined aquifer that is capable of yielding several hundred to 1,000 gallons per minute (gpm) in municipal and industrial wells in the MCB, Camp Lejeune area. Figure 7 identifies the locations of these supply wells within a one-mile radius of the site.

No contamination was indicated in any of the five active supply wells (Geophex, 1991). Production well BB44 is located approximately 1,200 feet from the site. The total depth of this well is 62 feet bgs and is screened from 32 to 62 feet bgs. This well was suspected to potentially have been impacted by surficial groundwater infiltration due to its relatively shallow screen. However, drilling logs for this well indicate the presence of confining units above the shallow screened interval, thus, well is not likely affected by surface waters (Geophex, 1991). Production well BB-44 was sampled in January and June 1997. For these sampling events, all volatile organic compounds (VOCs) tested for by USEPA method 524.2 were below the analytical laboratory's stated detection limit of 0.5 micrograms per kilogram (µg/kg).

## 5.6 Ecology

During May 15 to 24, 1995, Baker conducted a qualitative habitat evaluation of the terrestrial environment at Site 65. The site and surrounding areas are dominated by a mixed forest composed of pine and deciduous trees. Cleared, sandy areas are located to the south and southeast of the site. Buildings, mowed grass, and paved surfaces are located to the west, and an earth moving training area is located east of Site 65. Mixed forest extends across Site 65, and is interspersed around the aforementioned zones. Topography is primarily broad and flat with scattered depressions.

Four habitat types are present at Site 65. These include forested areas, two separate wetland areas, and a low-lying drainage area. Wetlands at the site were classified as Palustrine systems, with unconsoldiated bottom class and a permenently flooded water regime.

One threatened or endangered plant species (rough-leaf loose strife) and one state candidate plant specie (Blackfruit Spikerush) were identified at the site.

## 5.7 Nature and Extent of Contamination

### 5.7.1 Remedial Investigation

Table 1 summarizes the RI analytical results. Detected contaminant concentrations were compared to screening criteria appropriate for each media. Surface soil screening criteria include USEPA Region III RBCs for residential land use, and two times base background concentrations (inorganics only). Base background levels for inorganics were established by compiling surface

soil and subsurface soil concentrations from samples that were collected from areas known to not have been used for site operations or disposal activities. The comparison criteria for groundwater are Federal MCLs and NCWQS. Inorganics in groundwater were also screened against base background levels (not presented in Table 1 for groundwater). Base background levels for inorganics in groundwater were established by compiling groundwater concentrations from samples collected from monitoring wells installed in areas known not to have been impacted by site activities, or upgradient of site activities across the Base (Baker, 1994b). Surface water contaminant concentrations were compared to freshwater screening values for human health (water and organism consumption) including USEPA Region IV Water Quality Standards or NCWQS, and upstream background concentrations from the White Oak River Basin Study (analytical results are presented in the RI). Sediment contaminant concentrations were compared against the average upstream background sediment concentrations from the White Oak River Basin Study. Fish tissue contaminant concentrations were compared to USEPA Region III RBCs for human ingestion of fish. Criteria reported in the table have been updated since the publication of the RI.

*Soil Investigations*

A total of 13 surface soil samples were collected at Site 65. Six of the samples were collected near the waste piles and burn area. The remaining samples were collected from other locations potentially impacted by historical activities at the site. VOCs, semivolatile organic compounds (SVOCs), pesticides, and inorganics were detected in surface soil. The analytical results from the surface soil samples are summarized below:

- Six VOCs were detected in the surface soil samples, although four of the compounds were determined to be laboratory contaminants because all detected concentrations were less than 10 times the maximum concentrations detected in the Quality Assurance/Quality Control (QA/QC) blanks. The two remaining VOCs detected at low levels in surface soils were ethylbenzene and total xylenes. The concentrations of these compounds did not indicate a specific source, but may have originated from vehicles and heavy equipment passing through the site.

- The most widespread SVOC detected was bis(2-ethylhexyl) phthalate, which was encountered at nine locations. This phthalate is a common plasticizer in rubber and

plastic products, such as tires. All of the sample locations with estimated concentrations of these phthalates are near roads or equipment training areas.

- PAH constituents were detected in three samples, all near existing or previously existing debris piles. The suspected source of the PAH contamination are the debris piles and historical burning areas at the site. Di-n-butyl phthalate was detected at two locations near the waste piles, but a specific source for this contaminant cannot be identified.

- Pesticides were detected in all areas of the site. The levels detected in the samples are similar to base-wide concentrations from the historical use of pesticides at Camp Lejeune.

- The PCB Aroclor 1260 was detected at one location near the burn area and the southernmost debris piles. Historical records do not indicate the disposal of PCBs; however, PCBs were detected in a subsurface soil sample collected during the 1991 Site Inspection. The detection of PCBs within the vicinity of the debris piles indicates that some product containing PCBs may have been spilled or disposed at the site.

- Surface soil sample analytical results for inorganics were compared to a screening level of two times average background concentrations. Seven of 13 sample locations exceeded two times the average base background for one or more inorganic. The detections were observed in the heavy equipment training area and the southernmost debris pile. The distribution of the inorganics indicates that they may be the result of rusting metal debris disposed at the site and the heavy equipment used for training.

A total of 13 subsurface soil samples were collected from the same locations as the surface soil sample locations. VOCs, SVOCs, and inorganics were detected in subsurface soil. The analytical results from the subsurface samples are summarized below:

- Five VOCs were detected in the subsurface soil samples, although four of the contaminants were determined to be laboratory-related because all detected concentrations were less than 10 times the maximum concentrations detected in the QA/QC blanks. Xylenes, a constituent of petroleum products which may have been deposited by heavy equipment, was the only non-laboratory related VOC detected.

- The most widespread SVOC detected was bis(2-ethylhexyl) phthalate. The source of this contaminant is assumed to be the same as for detections in surface soil, although this compound is also commonly a laboratory and field contaminant.

- Di-n-butyl phthalate was detected in the subsurface soil at the same two locations where it was detected in the surface soils. The remaining 14 SVOCs, all PAH constituents, were detected at the same sampling location where they were detected in the surface soil.

- Pesticide detections in subsurface soils mainly occurred in areas where the soils have been either disturbed by excavation or disposal. The occurrence of pesticide contamination may be attributed to the historical use of pesticides at MCB, Camp Lejeune.

- PCBs were not detected in the subsurface soil samples collected during the RI.

- Nine of 13 subsurface soil sample locations exceeded two times the average base background for one or more inorganic constituent. The majority of the inorganics occurred in either the heavy equipment training area or the debris piles. The suspected source of inorganics is rusting metal.

- A total of six subsurface soil samples were collected from test pits near the waste piles and burn area. Three VOCs were detected in the soil samples from the test pits, although all of the compounds were determined to be laboratory contaminants. The most widespread SVOC detected was di-n-butyl phthalate, which was detected at all six test pit locations. Pesticide results for subsurface test-pit soil samples included detections at four of six locations. All six test pit sample locations exceeded two times the average base background for two or more inorganics. The suspected source of the inorganics is the rusting debris disposed of in these piles.

*Groundwater Investigation*

Groundwater samples were collected from three existing wells, and seven wells installed during the RI. VOCs, SVOCs, and inorganics were detected in groundwater. The analytical results are summarized below:

- Five VOCs were detected in groundwater samples collected at the site. Four were determined to be laboratory contaminants because detected concentrations were less than 10 times the maximum concentrations in QA/QC samples. Carbon disulfide was the only VOC detected in the groundwater samples that was not determined to be a laboratory contaminant. It was detected in one upgradient sample location at a low concentration.

- The SVOC naphthalene was detected in one upgradient sample location at a low concentration.

- Groundwater samples collected from the monitoring wells contained no detectable concentrations of pesticides or PCBs.

- Inorganic concentrations were, on average, one or two orders of magnitude below the base background levels for groundwater. Only two of the inorganics, iron and manganese, were detected at concentrations that exceed the screening criteria. Neither iron nor manganese concentrations, however, exceeded the federal standard in any of the samples collected at the site, and these inorganics are normally found at similar concentrations in groundwater throughout the Base.

*Surface Water and Sediment Investigations*

Two surface water samples were collected, one each from Powerline Pond and Courthouse Bay Pond. VOCs and inorganic compounds were detected. The analytical results are summarized below:

- Two organic compounds were detected in surface water and were attributable to laboratory contamination because detected concentrations were less than 10 times the maximum concentration in QA/QC samples.

- A total of 13 inorganics were detected in the surface water samples. Aluminum, barium, copper, iron, lead, manganese, vanadium and zinc exceeded the lowest surface water screening value. All of the detected inorganic concentrations, except iron, exceeded the average reference station concentration established at Camp Lejeune. The only sources of recharge for the ponds are groundwater and stormwater runoff. Since groundwater

was not found to be significantly impacted, water evaporation and soil erosion are the suspected causes of elevated inorganics in the ponds.

A total of four sediment samples were collected at Site 65; two samples from each surface water sample location (0-6 inches and 6 to 12 inches). VOCs, SVOCs, pesticides, and inorganics were detected in sediment. The analytical results are summarized below:

- Carbon tetrachloride and tetrachloroethene were the only two VOCs detected in sediment that were not attributable to laboratory contamination. The other four VOCs were detected below, or only slightly above 10 times the maximum concentrations in QA/QC samples. The specific sources of carbon tetrachloride and tetrachloroethene have not been determined, but are suspected to have originated from various site operations. The detected levels did not exceed sediment screening values.

- Only one SVOC, di-n-butylphthalate, was detected in the sediment samples, but it is believed to be the result of laboratory contamination because it was detected at less than 10 times the maximum concentration in the QA/QC samples.

- Pesticides, including beta-BHC, 4,4'-DDD, and 4,4'-DDE, were detected in all of the sediment samples collected. All of these pesticides exceeded the lowest sediment screening value (SSV) and the average reference concentration. These concentrations are similar to the concentrations detected in the surface soils across the site.

- Thirteen inorganics were detected in the sediment. Copper, lead and zinc were detected at concentrations exceeding the lowest SSV only one time; however, all of these inorganics exceeded the average reference concentration (White Oak River Basin Study) at least one time. The inorganics are suspected to be the result of metals precipitation accumulated within the surface water as evaporation occurs.

*Fish Tissue*

Organics and inorganics were detected in fish tissue. Four fish-tissue samples were collected for fillet analysis, and five fish-tissue samples were collected for whole-body analysis. The analytical results are summarized below:

- Only two organics, acetone and 4,4'-DDD, were detected in the fillet samples.

- Twelve inorganics were detected in the fillet samples: aluminum, barium, calcium, copper, magnesium, manganese, mercury, potassium, selenium, sodium, thallium, and zinc.

- Four VOCs were detected in the whole-body samples, but they were all determined to be laboratory contaminants.

- There were no SVOCs detected in the whole-body samples.

- There were two pesticides, 4,4'-DDD and 4,4'-DDE, detected in the whole-body samples.

- Seventeen inorganics were detected in the whole-body samples: aluminum, antimony, arsenic, barium, beryllium, calcium, copper, iron, lead, magnesium, manganese, mercury, potassium, selenium, sodium, thallium, and zinc. Because mercury was not detected in any media with the exception of fish tissue, mercury contamination does not appear to be related to Site 65 or the local environment. Other potential sources for mercury in fish could be that the fish were transported to the ponds from off-site sources, or that bioaccumulation is occurring through a food chain.

### 5.7.2 Post-RI Sampling

Post-RI sampling was conducted near Site 65 to determine if contaminants were released from dissolved drum piles that were discovered in early 2001. The piles are located the wooded area to the south of Courthouse Bay Pond along its tributary to Courthouse Bay. A site walk was conducted in March 2001 and the location of piles was verified.

This area was not in the original Site 65 boundary, but is included under this OU because activities similar to those conducted in the original Site 65 boundary were conducted in this area.

Soil, surface water, sediment, and groundwater samples were collected from the area shown on Figure 8 in April 2001. Table 2 summarizes the post-RI sampling analytical results. Detected contaminant concentrations were compared to screening criteria appropriate for each media. Surface soil screening criteria include USEPA Region III RBCs for residential land use, USEPA

Region IX Preliminary Remediation Goals (PRGs) for residential land use, and two times average base background concentrations (inorganics only) as described for the RI. The comparison criteria for groundwater are Federal MCLs and NCWQS. Surface water contaminant concentrations were compared to USEPA Tier II freshwater screening values for human health (water and organism consumption), and NCWQS for fresh surface water, and average upgradient surface water values from the White Oak River Basin Study (Baker, 1994c), representing average background conditions. Sediment contaminant concentrations were compared to USEPA Region IV ecological screening levels for freshwater and average upgradient sediment values from the White Oak River Basin.

*Soil Investigations*

Two surface soil and four subsurface soil samples were collected at Site 65 in April of 2001 and were analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, and metals. VOCs, SVOCs, pesticides, herbicides, and metals were detected in the surface soil samples. None of the detected concentrations for VOCs, SVOCs, pesticides, PCBs, or herbicides exceeded any screening criteria. The inorganics aluminum, copper, and sodium were detected at concentrations exceeding both Region III RBCs and Region IX PRGs. Thirteen inorganics were detected at concentrations exceeding two times base background concentrations.

VOCs, SVOCs, pesticides, herbicides, and inorganics were also detected in subsurface soils. None of the detected concentrations of VOCs, SVOCs, pesticides, or herbicides exceeded screening criteria. The inorganic arsenic was detected at concentrations exceeding both Region III RBCs and Region IX PRGs. The essential nutrients calcium and sodium were detected at concentrations exceeding two times base background concentrations.

The source of inorganics in surface and subsurface soils at Site 65 is believed to be rusting metal debris disposed of at the site.

*Groundwater Investigation*

Groundwater samples were collected from three temporary wells. VOCs, total, and dissolved metals were detected in groundwater. None of the detected concentrations of VOCs exceeded screening criteria. Of the inorganics that were detected, concentrations of iron and manganese

exceeded NCWQS. These inorganics are normally found at similar concentrations in groundwater throughout the Base.

*Surface Water and Sediment Investigations*

Three surface water and sediment samples were collected. VOCs and metals were detected in surface water. None of the detected concentrations of VOCs exceeded screening criteria. The metals arsenic, chromium, copper, iron, lead, manganese, thallium, and zinc were detected at concentrations exceeding EPA Tier II freshwater screening values and/ or NCWQS for surface water. Maximum detected concentrations of aluminum, barium, calcium, iron, magnesium, and sodium exceeded average concentrations detected in upgradient areas of the White Oak River Basin. Water evaporation and soil erosion are suspected to be the source of elevated inorganics in the surface water.

VOCs, SVOCs, pesticides, herbicides, and metals were detected in sediment. There are no sediment screening values for the six VOCs that were detected in sediment. Of the four SVOCs that were detected in sediment, only one has an established screening criteria that the detected concentration it can be compared to. This contaminant concentration did not exceed the sediment screening criteria. The pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, alpha chlordane, dieldrin, endrin, endrin aldehyde, endrin ketone, and gamma chlordane were detected at concentrations exceeding Region IV ecological screening levels for freshwater. The levels detected in these samples are similar to base-wide concentrations from the historical use of pesticides at Camp Lejeune. Maximum detections of the pesticides 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endrin aldehyde, and p,p'-methoxychlor exceeded average concentrations detected in sediments in upgradient areas of the White Oak River Basin. There are no screening criteria for herbicides in sediment. The inorganics barium, copper, and lead were also detected at concentrations exceeding Region IV ecological screening levels for freshwater. Each of these inorganics and aluminum, arsenic, calcium, chromium, iron, magnesium, manganese, selenium, vanadium, and zinc were detected at concentrations exceeding average concentrations in upgradient areas of the White Oak River Basin. The inorganics are suspected to be the result of metals precipitation accumulated within the surface water as evaporation occurs.

## 6.0 CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

Site 65 is a primarily wooded area located immediately east of the Marine Corps Engineer School which occupies property between Site 65 and the bay. The school is used for maintenance, storage, and operator training of amphibious vehicles and heavy construction equipment. The school also utilizes a several acre parcel located just east of Site 65 to conduct heavy equipment training activities. Two surface ponds are located immediately east of the training facilities that have recreational fishing available, and are stocked by the base fishing commission. Also, there are some physical fitness trails and exercise stops that run throughout the site and surrounding areas. Several wide, cleared trails for tanks and heavy equipment cross the site. The current land use is unlikely to change in the immediate future.

As discussed in the Site Characteristics section of this document, five active groundwater supply wells are located within a one-mile radius of the site. It is likely that these wells will continue to be used in the immediate future.

## 7.0 SUMMARY OF SITE RISKS

As part of the RI, human health and ecological RAs were conducted to determine the potential risks associated with the chemical constituents detected at Site 65. The RAs are based only on the RI data because the post-RI work was conducted subsequent to the RAs. The following subsections briefly summarize the findings of the human health and ecological RAs.

### 7.1 Human Health Risk Assessment

A quantitative human health RA was conducted for Site 65. This included identification of contaminants of potential concern (COPCs), and calculation of potential carcinogenic and non-carcinogenic risk for different human receptors.

#### 7.1.1 Selection of COPCs

During the human health RA, chemicals of potential concern (COPCs) were selected for surface soil, subsurface soil, groundwater, surface water, sediment, and fish tissue as shown on Table 3. The selection of COPCs was based on methodology described in the USEPA Risk Assessment Guidance for Superfund (USEPA, 1989a, 1989b, 1991a, 1991b, 1995). COPCs were selected by

comparing detected concentrations to contaminant-specific screening criteria, as well as by evaluation of site and contaminant characteristics. Criteria used in selecting a detected contaminant as a COPC included historical information, background and naturally occurring levels, field and laboratory blank data, USEPA Region III Contaminants of Concern, prevalence, federal and state criteria and standards, toxicity, anthropogenic levels, persistence, and mobility.

As shown on Table 3, no detected VOCs, pesticides, or PCBs exceeded screening criteria and were not retained as COPCs in surface soil. Two SVOCs, benzo(a)pyrene and dibenzo(a, h)anthracene, were retained as a COPCs because the maximum concentrations exceeded the residential soil screening values. Manganese and thallium were the only inorganics that were retained as surface soil COPCs because they exceeded the residential soil screening values.

For subsurface soil, no VOCs, pesticides, or PCBs were retained as COPCs. Benzo(a)anthracene, benzo(a)pyrene, aluminum, iron, and manganese were retained as COPCs because their maximum concentrations exceeded residential soil screening levels. Lead was retained as a COPC because its maximum concentration exceeded the lead action level. Antimony, arsenic, copper, nickel, and thallium were retained as subsurface soil COPCs because their concentrations exceeded background and/or residential soil screening levels.

For groundwater, no SVOCs, pesticides, or PCBs were retained because their concentrations did not exceed the tap water screening values and/or the blank sample concentration. Carbon disulfide, manganese, and iron were retained as COPCs because their concentrations exceeded tap water screening criteria. It should be noted that 1,2-dichloroethane, bis(2-ethylhexyl)phthalate, and aluminum were not retained as COPCs because their concentrations did not exceed blank contamination (organics), or naturally occurring levels (aluminum).

For surface water, no VOCs, SVOCs, pesticides, or PCBs were retained as COPCs because their concentration did not exceed the North Carolina Water Quality Standards, and/or blank sample concentrations. Copper, iron, lead, and zinc were detected at concentrations greater than corresponding NCWQS and were retained as COPCs. There were no NCWQS for aluminum, barium, manganese, and vanadium, so these inorganics were also retained as surface water COPCs.

For sediment, no VOCs, SVOCs, pesticides, or PCBs were retained as COPCs because their concentrations were less than the respective residential soil screening values and/or blank sample

concentrations. Aluminum, antimony, chromium, and iron were detected at concentrations that exceeded corresponding soil RBCs. Therefore, these inorganics were retained as sediment COPCs.

No VOCs, SVOCs, pesticides, or PCBs were retained as COPCs for fish tissue. Mercury and thallium were the only constituents retained as COPCs for fish tissue because their concentrations exceeded fish tissue screening levels. However, it should be noted that the North Carolina Department of Health and Human Services was contacted regarding the constituents detected in fish and crab tissue. The state toxicologist concluded that consumption of fish and crab found at this site should not pose a significant health risk (see Appendix C).

### 7.1.2 Quantification of Exposure

For each COPC, incremental cancer risk (ICR) and hazard index (HI) values were calculated to quantify potential carcinogenic and noncarcinogenic risks, respectively. An ICR is a value that indicates the probability of developing cancer when exposed to certain contaminants. The USEPA has established an acceptable range of carcinogenic risk is $1x10^{-6}$ to $1x10^{-4}$. This means that the acceptable range is between one person in a million and one person in ten thousand getting cancer in one's lifetime due to exposure to contaminants. A HI is an index that compares the site contaminant concentrations to reference concentrations (federal guidelines and literature values), if exceeded, could cause non-carcinogenic health risk. An HI greater than 1.0 indicates a potential human health risk due to exposure to a contaminant.

#### 7.1.2.1 Current Scenario

Under the current exposure scenario, military personnel (trainee), military personnel (recreational user), adult and child fisherman receptors were evaluated as potential receptors, and risk values were calculated for exposure to surface soil (military personnel - trainee and recreational user); subsurface soil (military personnel - trainee); inhalation of particles (military personnel - trainee and recreational user); and surface water, sediment and fish tissue (fisherman). ICR values did not exceed the USEPA acceptable risk range of $1x10^{-4}$ to $1x10^{-6}$. Thus, there are no unacceptable carcinogenic current risks associated with any media at Site 65. The HI values for the child- and adult fisherman receptor (HI = 6.1 and 1.3, respectively) exceeded unity due to the ingestion of fish tissue. The elevated HI values associated with fish tissues are primarily due to mercury which does not appear to be site related for the following reasons: (1) mercury was detected only

in fish tissue and not in any other site media; (2) the ponds where mercury was detected are not located near the heavy equipment training area which prevents them from being impacted by Site 65 surface runoff; and (3) the ponds were stocked with fish from off-site sources. However, upon review of site data, the North Carolina state toxicologist concluded that consumption of fish and crab tissue from this site would not pose a significant threat to human health (see Appendix C).

7.1.2.2 Future Scenario

Under the future scenario, child and adult residents were evaluated as potential receptors, and risk values were calculated for exposure to surface soil, subsurface soil, groundwater, surface water, and sediment. ICR values did not exceed the USEPA acceptable risk range of $1x10^{-4}$ to $1x10^{-6}$. Thus, there are no unacceptable carcinogenic future risks associated with any media at Site 65. The HI values for the child resident receptor (HI = 3.0) exceeded unity due to the ingestion of iron in groundwater. However, iron is still considered an essential nutrient, and toxicity criteria have not been finalized by the USEPA. Further, the central tendency (CT) exposure scenarios calculated for the child resident showed no unacceptable risk.

## 7.2 Ecological Risk Assessment

During the ecological RA, ecological COPCs were selected for surface water, sediment, surface soil, and fish tissue, as shown in Table 4. Criteria used to select ecological COPCs included historical information, prevalence, toxicity, federal and state criteria and standards, field and laboratory blank data, background and naturally occurring levels, and anthropogenic levels.

For surface soil, six VOCs (methylene chloride, acetone, trichloroethene, toluene, ethylbenzene, and xylenes) were detected in the surface soil. Methylene chloride, acetone, and toluene were not retained as COPCs because they are common laboratory contaminants and they were detected at less than 10 times the concentration in the blank samples. Trichloroethene, ethylbenzene, and xylenes were retained as COPCs. Nineteen SVOCs were detected in the surface soil. Acenaphthene, 2,4-dinitrophenol, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, ideno(1,2,3-cd)pyrene, benzo(g,h,i)perylene, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzofuran, fluorene, phenanthrene, di-n-butylphthalate, fluoranthene, pyrene, and bis(2-ethylexyl)phthalate were retained as COPCs. Five pesticides were detected in the surface soil. Endosulfan II, 4,4'-DDE, 4,4'-DDT, 4,4'-DDD, and heptachlor epoxide were retained as COPCs. Aroclor 1260 was detected in one of the surface soil samples

and was retained as a COPC. Fifteen metals were detected in the surface soil. Calcium, magnesium, potassium, and sodium were not retained as a COPCs. Copper was not retained as a COPC because it was detected at a concentration of less than five times the concentration in the blank sample. Aluminum was not retained as a COPC because it was detected at concentrations of less than twice base background. Barium, chromium, iron, lead, manganese, nickel, thallium, vanadium and zinc were retained as COPCs.

Two VOCs (acetone, and 1,2-dichloroethane) were detected in the surface water. Neither contaminant was retained as a COPC for aquatic and terrestrial receptors because they are common laboratory contaminants and were detected at a concentration of less than 10 times the concentration in the blank sample. No SVOCs, pesticides, or PCBs were detected in the surface water samples. Thirteen metals were detected in the surface water samples. Calcium, magnesium, potassium, and sodium were not retained as COPCs for aquatic or terrestrial receptors. Chromium was not retained as a COPC for aquatic receptors because detected concentrations do not exceed the surface water screening values. However, chromium was retained as a COPC for terrestrial receptors. Aluminum, barium, copper, iron, lead, manganese, vanadium, and zinc were retained as COPCs for both aquatic and terrestrial receptors.

At each station, sediment samples were collected from two depths, zero to six inches and six to 12 inches. Six VOCs were detected in the sediment. Acetone, chloroform, and toluene were not retained as COPCs because they are common laboratory contaminants and were detected at a concentration of less than 10 times the concentration in the blank sample. Carbon tetrachloride, 2-butanone, and tetrachloroethene were not retained as COPCs because they were detected at concentrations below sediment screening values (SSVs). One SVOC (di-n-butylphthalate) was detected and retained as a COPC in sediment. Three pesticides were detected in the sediment. Beta-BHC, 4,4'-DDE, and 4,4'-DDD were all retained as COPCs. Fifteen metals were detected in the sediment. Calcium, magnesium, potassium, and sodium were not retained as COPCs. Barium, chromium, iron, and manganese were not retained as COPCs because they did not exceed their respective SSVs. Aluminum, antimony, cobalt, copper, lead, vanadium, and zinc were retained as COPCs.

For the fish-fillet sample, one VOC (acetone) was detected and retained as a COPC in the fish fillet tissue. No SVOCs were detected in the fish fillet samples. One pesticide (4,4'-DDD) was detected and retained as a COPC. For the whole-body fish samples, four VOCs were detected in the fish, whole-body tissue. Acetone, 2-butanone, methylene chloride, and toluene were retained

as COPCs. No SVOCs were detected in the fish, whole-body samples. Two pesticides were detected in the fish, whole-body tissue. Pesticides 4,4'-DDD and 4,4'-DDE were retained as COPCs. Seventeen metals were detected in the fish, whole-body tissue. Calcium, magnesium, potassium, and sodium were not retained as COPCs. The remaining thirteen metals (aluminum, antimony, arsenic, barium, beryllium, copper, iron, lead, manganese, mercury, selenium, thallium, and zinc) were retained as COPCs.

Following the selection of ecological COPCs, the potential ecological risks associated with each COPC were evaluated. The paragraphs that follow summarize the conclusions made for aquatic and terrestrial receptors at Site 65.

### 7.2.1 Aquatic Ecosystem

There is a moderate potential risk to aquatic life in Courthouse Bay Pond, with most of the risk associated with the non-site-related inorganics in the surface water. There is only a slight risk to aquatic life in Powerline Pond; however, these risks are due to non-site-related contaminants (4,4'-DDD and 4,4'-DDE). Based on the ecological RA, no further investigations are deemed necessary.

### 7.2.2 Terrestrial Ecosystem

Some potential impacts to soil invertebrates and plants may occur as a result of site-related contaminants. It should be noted that there is much uncertainty in the Surface Soil Screening Values (SSSVs) used to assess this impact. In addition, a potential decrease in the terrestrial vertebrate population from site-related contamination is not expected based on the terrestrial intake model that is included in the RI ecological RA.

## 8.0 EXPLANATION OF SIGNIFICANT CHANGES

The PRAP presents the No Action remedy as the preferred alternative for Site 65. No significant changes to the remedy detailed in that document have been made.

## 9.0 REFERENCES


Baker Environmental, Inc. (Baker). 1994a. Final Site Inspection Report, Site 65 Engineer Dump Area, Marine Corps Base, Camp Lejeune, North Carolina. January 1994.

Baker. 1994b. Draft Evaluation of Metals in Groundwater, Marine Corps Base, Camp Lejeune, North Carolina. June 1994.

Baker. 1994c. White Oak River Basin Study. 1994.

Baker. 1997. Final Remedial Investigation Report, Operable Unit No. 9 (Site 65), Marine Corps Base Camp Lejeune, North Carolina. Prepared for the Department of the Navy Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia. November 1997.

Baker. 2001a. Post-RI Sampling Letter Report. Prepared for the Department of the Navy Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia. June 2001.

Baker. 2001b. Proposed Remedial Action Plan. Prepared for the Department of the Navy Atlantic Division, Naval Facilities Engineering Command, Norfolk, Virginia. June 2001.

Geophex, Ltd. 1991. Wellhead Management Program Engineering Study 91-36. Prepared for the Officer in Charge of Construction, Marine Corps Base, Camp Lejeune, North Carolina. January 1991.

USEPA. 1989a. United States Environmental Protection Agency. Risk Assessment Guidance for Superfund Volume I. Human Health Evaluation Manual (Part A) Interim Final. Office of Solid Waste and Emergency Response. Washington, D.C. EPA/540/1-89-002. December 1989.

USEPA. 1989b. United States Environmental Protection Agency. Risk Assessment Guidance for Superfund Volume II. Environmental Evaluation Manual Interim Final. Office of Solid Waste and Emergency Response. Washington, D.C. EPA/540/1-89-001. December 1989.

USEPA. 1991a. United States Environmental Protection Agency. Risk Assessment Guidance for Superfund Volume I. Human Health Evaluation Manual Supplemental Guidance. "Standard

Default Exposure Factors" Interim Final. Office of Solid Waste and Emergency Response. Washington, D.C. OSWER Directive 9285.6-03. March 25, 1991.

USEPA. 1991b. United States Environmental Protection Agency. Supplemental Region IV Risk Assessment Guidance. Health Assessment Office. March 20, 1991.

USEPA. 1995. United States Environmental Protection Agency. Supplemental Guidance to RAGS: Region IV Bulletins. Office of Water. Washington, D.C. November, 1995.

Water and Air Research, Inc. (WAR). 1983. Initial Assessment Study of Marine Corps Base, Camp Lejeune, North Carolina. Prepared for Naval Energy and Environmental Support Activity.

## RESPONSIVENESS SUMMARY

The selected remedy for Site 65, OU No. 9, is No Action.

The USEPA Region IV and NC DENR are in support of the selected remedy outlined herein for OU No. 9. A concurrence letter from the NC DENR is included in Appendix A.

Based on comments received from the audience of the July 18, 2001 public meeting, the public supports the selected remedy for OU No. 9. No additional comments were made during the public comment period which ended on August 10, 2001. The public meeting consisted of a presentation of OU Nos. 9 and 17, and question and answers. OU No. 9 was presented during the first half of the public meeting. The transcript for the public meeting is provided in Appendix B. The entire public meeting transcript has been reproduced in this ROD because both presentations were included in the same legally sealed and certified report document.

The attendees of the public meeting included representatives from Naval Facilities Engineering Command, Atlantic Division (LANTDIV); MCB Camp Lejeune Environmental Management Division (EMD); NC DENR Superfund Section; USEPA Region IV; Restoration Advisory Board (RAB) Community Members; and Baker. In attendance were:

| | |
|---|---|
| Laura Baker | RAB Community Member |
| Ellen Bjerklie Hanna | Baker |
| Rich Bonelli | Baker |
| Thomas Burton | MCB Camp Lejeune EMD |
| Heather Govenor | Baker |
| Carrie Anne Hayward | RAB Community Member |
| Bart Herpel | Community Member |
| Ray Humphries | RAB Community Member |
| David Lown | NC DENR, Superfund Section |
| Steve Martin | LANTDIV |
| Rick Raines | MCB Camp Lejeune EMD |
| Kirk Stevens | LANTDIV |
| Jim Swartenberg | RAB Community Chairperson |
| Gena Townsend | USEPA Region IV |
| Karren Wood | Baker |

In general, the meeting attendees asked about mercury in fish samples, the safety of eating fish from the ponds at Site 65, and sampling methods. All questions asked at the meeting were resolved so no follow up on any issue is required.

# TABLES

**TABLE 1**

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Surface Soil[(1)] | Volatiles | Methylene Chloride | $8.5 \times 10^4$ | NA | 2J | 2J | 65-MW07A-00 & SB12-00 | 2/13 | 0 | NA |
| | | Acetone | $7.8 \times 10^5$ | NA | 10J | 10J | 65-MWO5A-00 | 1/13 | 0 | NA |
| | | Trichloroethene | $5.8 \times 10^4$ | NA | 1J | 1J | 65-SB06-00 | 1/13 | 0 | NA |
| | | Toluene | $1.6 \times 10^6$ | NA | 1J | 2J | 65-DW04-00 & MW07A-00 | 3/13 | 0 | NA |
| | | Ethylbenzene | $7.8 \times 10^5$ | NA | 1J | 1J | 65-SB07-00 | 1/13 | 0 | NA |
| | | Xylene (total) | $1.6 \times 10^7$ | NA | 3J | 5J | 65-SB07-00 | 2/13 | 0 | NA |
| | Semivolatiles | Acenaphthene (PAH) | $4.7 \times 10^5$ | NA | 130J | 130J | 65-DW01-00 | 1/13 | 0 | NA |
| | | 2,4-Dinitrophenol | $1.6 \times 10^4$ | NA | 150J | 150J | 65-DW04-00 | 1/13 | 0 | NA |
| | | Dibenzofuran | $3.1 \times 10^4$ | NA | 58J | 58J | 65-DW01-00 | 1/13 | 0 | NA |
| | | Fluorene (PAH) | $3.1 \times 10^5$ | NA | 100J | 100J | 65-DW01-00 | 1/13 | 0 | NA |
| | | Phenanthrene (PAH) | $2.3 \times 10^5$ | NA | 59J | 860 | 65-DW01-00 | 3/13 | 0 | NA |
| | | Anthracene (PAH) | $2.3 \times 10^6$ | NA | 190J | 190J | 65-DW01-00 | 1/13 | 0 | NA |
| | | Carbazole | $3.2 \times 10^4$ | NA | 180J | 180J | 65-DW01-00 | 1/13 | 0 | NA |
| | | di-n-Butyl-phthalate | $7.8 \times 10^5$ | NA | 260J | 390J | 65-SB06-00 | 2/13 | 0 | NA |
| | | Fluoranthene (PAH) | $3.1 \times 10^5$ | NA | 130J | 830 | 65-DW01-00 | 3/13 | 0 | NA |
| | | Benzo(a)anthracene (PAH) | 870 | NA | 76J | 510 | 65-DW01-00 | 3/13 | 0 | NA |
| | | Chrysene (PAH) | $8.7 \times 10^4$ | NA | 70J | 470 | 65-DW01-00 | 3/13 | 0 | NA |
| | | bis(2-Ethylhexyl)phthalate | $4.6 \times 10^4$ | NA | 48J | 87J | 65-MW06A-00 | 9/13 | 0 | NA |
| | | Benzo(b)fluoranthene (PAH) | 870 | NA | 89J | 360J | 65-DW01-00 | 3/13 | 0 | NA |
| | | Benzo(k)fluoranthene (PAH) | 8700 | NA | 120J | 510 | 65-DW01-00 | 2/13 | 0 | NA |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
ND - Not detected
PAH - Polynuclear aromatic hydrocarbon

(1) Organics and Metals in both surface and subsurface soils are compared to EPA Region III Risk Based Concentrations (RBCs) for a residential area (Criteria I) (EPA updated 5/8/2001), and two times base background concentrations for MCB, Camp Lejeune (Criteria II) (Metals only). Only priority pollutant metals (i.e., aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, silver, thallium, vanadium, zinc) are presented on this table. For lead, the residential action level in soil is used (USEPA, 1994). Refer to the RI for completed metals detection data.

**TABLE 1 *(Continued)***

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Surface Soil | Semivolatiles (continued) | Benzo(a)pyrene (PAH) | 87 | NA | 100J | 400 | 65-DW01-00 | 2/13 | 2 | NA |
| | | Indeno(1,2,3-cd)pyrene (PAH | 870 | NA | 88J | 310J | 65-DW01-00 | 2/13 | 0 | NA |
| | | Dibenzo(a,h)anthracene (PAH | 87 | NA | 45J | 150J | 65-DW01-00 | 2/13 | 1 | NA |
| | | Benzo(g,h,i)perylene (PAH) | $2.3 \times 10^5$ | NA | 70J | 250J | 65-DW01-00 | 2/13 | 0 | NA |
| | Pesticides | Heptachlor epoxide | 70 | NA | 2.3 | 2.3 | 65-MW07A-00 | 1/13 | 0 | NA |
| | | 4-4'-DDE | 1900 | NA | 4.3 | 83J | 65-MW07A-00 | 6/13 | 0 | NA |
| | | Endosulfan II | $4.7 \times 10^4$ | NA | 3.8NJ | 3.9NJ | 65-DW02-00 | 2/13 | 0 | NA |
| | | 4-4'-DDD | 2700 | NA | 3.8NJ | 59J | 65-SB10-00 | 7/13 | 0 | NA |
| | | 4-4'-DDT | 1900 | NA | 25 | 56J | 65-MW07A-00 & SB07-00 | 3/13 | 0 | NA |
| | PCBs | Aroclor 1260 | 320 | NA | 52J | 52J | 65-DW01-00 | 1/13 | 0 | NA |
| | Metals | Aluminum | 7800 | 5940 | 656 | 5040 | 65-DW01-00 | 13/13 | 0 | 0 |
| | | Barium | 550 | 17.36 | 2.7 | 36.3 | 65-DW01-00 | 13/13 | 0 | 3 |
| | | Chromium | 23 | 3.693 | 2.3 | 8.6 | 65-DW01-00 | 11/13 | 0 | 2 |
| | | Copper | 310 | 7.2 | 2.5 | 55.6 | 65-DW01-00 | 9/13 | 0 | 6 |
| | | Iron | 2300 | 3755 | 50.9 | 16400 | 65-SB12-00 | 13/13 | 3 | 2 |
| | | Lead | 400 | 23.75 | 2 | 178 | 65-DW01-00 | 13/13 | 0 | 4 |
| | | Manganese | 160 | 18.5 | 2.9 | 163J | 65-DW01-00 | 13/13 | 3 | 5 |
| | | Nickel | 160 | 3.434 | 4.6 | 5.7 | 65-SB12-00 | 2/13 | 0 | 2 |
| | | Thallium | 0.55 | 0.889 | 2.3 | 2.3 | 65-SB10-00 | 1/13 | 1 | 1 |
| | | Vanadium | 55 | 11.63 | 2.8 | 12 | 65-DW01-00 | 9/13 | 0 | 1 |
| | | Zinc | 2300 | 13.88 | 3.7 | 377J | 65-DW01-00 | 11/13 | 0 | 6 |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
ND - Not detected
PAH - Polynuclear aromatic hydrocarbon

**TABLE 1 *(Continued)***

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Subsurface Soil[(1)] | Volatiles | Acetone | $7.8 \times 10^5$ | NA | 7J | 380 | 65-DW02-02 | 13/19 | 0 | NA |
| | | Carbon Disulfide | $7.8 \times 10^5$ | NA | 2J | 2J | 65-TP04 | 1/19 | 0 | NA |
| | | 2-Butanone | $4.7 \times 10^6$ | NA | 2J | 29 | 65-TP05 | 3/19 | 0 | NA |
| | | Trichloroethene | $5.8 \times 10^4$ | NA | 2J | 2J | 65-SB07-04 | 1/19 | 0 | NA |
| | | Toluene | $1.6 \times 10^6$ | NA | 1J | 1J | 65-SB11-04 | 1/19 | 0 | NA |
| | | Xylene (total) | $1.6 \times 10^7$ | NA | 1J | 3J | 65-SB10-01 | 5/19 | 0 | NA |
| | Semivolatiles | Naphthalene (PAH) | $1.6 \times 10^5$ | NA | 55J | 55J | 65-TP07 | 1/19 | 0 | NA |
| | | 2-Methylnaphthalene | $1.6 \times 10^5$ | NA | 60J | 60J | 65-TP07 | 1/19 | 0 | NA |
| | | Acenaphthene | $4.7 \times 10^5$ | NA | 94J | 97J | 65-SB06-02 | 2/19 | 0 | NA |
| | | Fluorene | $3.1 \times 10^5$ | NA | 110J | 110J | 65-SB06-02 | 1/19 | 0 | NA |
| | | Dibenzofuran | $3.1 \times 10^4$ | NA | 42J | 42J | 65-TP07 | 1/19 | 0 | NA |
| | | Phenanthrene (PAH) | $2.3 \times 10^5$ | NA | 150J | 1200 | 65-SB06-02 | 2/19 | 0 | NA |
| | | Anthracene | $2.3 \times 10^6$ | NA | 290J | 290J | 65-SB06-02 | 1/19 | 0 | NA |
| | | Carbazole | $3.2 \times 10^4$ | NA | 120J | 120J | 65-SB06-02 | 1/19 | 0 | NA |
| | | di-n-Butylphtalate | $7.8 \times 10^5$ | NA | 160J | 340J | 65-SB06-02 | 8/19 | 0 | NA |
| | | Fluoranthene (PAH) | $3.1 \times 10^5$ | NA | 230J | 1900 | 65-SB06-02 | 2/19 | 0 | NA |
| | | Pyrene (PAH) | $2.3 \times 10^5$ | NA | 190J | 1400 | 65-SB06-02 | 2/19 | 0 | NA |
| | | Benzo(a)anthracene (PAH) | 870 | NA | 100J | 900 | 65-SB06-02 | 2/19 | 1 | NA |
| | | Chrysene (PAH) | $8.7 \times 10^4$ | NA | 110J | 800 | 65-SB06-02 | 2/19 | 0 | NA |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
ND - Not detected
PAH - Polynuclear aromatic hydrocarbon

(1) Organics and Metals in both surface and subsurface soils are compared to EPA Region III Risk Based Concentrations (RBCs) for a residential area (Criteria I) (EPA, updated 5/8/2001), and two times base background concentrations for MCB, Camp Lejeune (Criteria II) (Metals only). Only priority pollutant metals (i.e., aluminum, antimony, arsenic, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, silver, thallium, vanadium, zinc) are presented on this table. Refer to Table the RI for completed metals detection data.

**TABLE 1 *(Continued)***

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Subsurface Soil | Semivolatiles (continued) | bis(2-ethylhexyl)phthalate | $4.6 \times 10^4$ | NA | 37J | 370 | 65-DW01-04 | 15/19 | 0 | NA |
| | | Benzo(b)fluoranthene (PAH) | 870 | NA | 96J | 710 | 65-SB06-02 | 2/19 | 0 | NA |
| | | Benzo(k)fluoranthene (PAH) | 8700 | NA | 110J | 620 | 65-SB06-02 | 2/19 | 0 | NA |
| | | Benzo(a)pyrene (PAH) | 87 | NA | 69J | 680 | 65-SB06-02 | 2/19 | 1 | NA |
| | | Ideno(1,2,3-cd)pyrene (PAH) | 870 | NA | 480 | 480 | 65-SB06-02 | 1/19 | 0 | NA |
| | | Benzo(g,h,i)perylene (PAH) | $2.3 \times 10^5$ | NA | 67J | 360J | 65-SB06-02 | 1/19 | 0 | NA |
| | Pesticides | Endosulfan I | $4.7 \times 10^4$ | NA | 3.1NJ | 3.1NJ | 65-TP05 | 1/19 | 0 | NA |
| | | 4,4'-DDE | 1900 | NA | 4.6 | 45J | 65-TP04 | 8/19 | 0 | NA |
| | | 4,4'-DDD | 2700 | NA | 4.4J | 340J | 65-TP05 | 8/19 | 0 | NA |
| | | 4,4'-DDT | 1900 | NA | 9.6 | 40 | 65-TP07 | 4/19 | 0 | NA |
| | | Endrin Aldehyde | 2300 | NA | 9.4J | 9.4J | 65-DW01-04 | 1/19 | 0 | NA |
| | | alpha-Chlordane | 1800 | NA | 8.3J | 8.3J | 65-SB06-02 | 1/19 | 0 | NA |
| | | gamma-Chlordane | 1800 | NA | 3J | 7.5J | 65-SB06-02 | 3/19 | 0 | NA |
| | PCBs | ND | NA | NA | NA | NA | NA | 0/19 | NA | NA |
| | Metals | Aluminum | 7800 | 7375 | 1020 | 10600 | 65-SB07-04 | 19/19 | 1 | 1 |
| | | Antimony | 3.1 | 6.409 | 11.8 | 11.8 | 65-TP07 | 1/19 | 1 | 1 |
| | | Arsenic | 0.43 | 1.968 | 2.6 | 3.3 | 65-SB06-02 | 3/19 | 3 | 3 |
| | | Barium | 550 | 14.2 | 2.7 | 38.3 | 65-SB06-02 | 19/19 | 0 | 7 |
| | | Cadmium | 3.9 | 0.712 | 1.3 | 1.3 | 65-SB06-02 & TP04 | 2/19 | 0 | 2 |
| | | Chromium | 23 | 12.56 | 2.6 | 17.3 | 65-SB07-04 | 16/19 | 0 | 1 |
| | | Cobalt | 160 | 1.504 | 11.5 | 11.5 | 65-TP07 | 1/19 | 0 | 1 |
| | | Copper | 310 | 2.416 | 7.7 | 67.2 | 65-TP07 | 8/19 | 2 | 8 |
| | | Iron | 2300 | 7252 | 236J | 31300 | 65-SB06-02 | 19/19 | 9 | 5 |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
ND - Not detected
PAH - Polynuclear aromatic hydrocarbon

**TABLE 1 *(Continued)***

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Subsurface Soil | Metals (continued) | Lead | 400 | 8.327 | 1.6 | 539 | 65-SB06-02 | 19/19 | 1 | 8 |
| | | Manganese | 160 | 7.919 | 2 | 471 | 65-SB06-02 | 19/19 | 2 | 10 |
| | | Nickel | 160 | 3.714 | 4.8 | 243 | 65-SB06-02 | 3/19 | 1 | 3 |
| | | Selenium | 39 | 0.801 | 1.5 | 1.5 | 65-TP07 | 1/19 | 0 | 1 |
| | | Silver | 39 | 0.866 | 4.2 | 4.2 | 65-TP07 | 1/19 | 0 | 1 |
| | | Thallium | 0.55 | 0.955 | 4.2 | 4.2 | 65-SB06-02 | 1/19 | 1 | NA |
| | | Vanadium | 55 | 13.45 | 3.1 | 27.2 | 65-SB07-04 | 15/19 | 0 | 1 |
| | | Zinc | 2300 | 6.662 | 2.5J | 764 | 65-SB06-02 | 16/19 | 0 | 12 |
| Groundwater[2] | Volatiles | Methylene Chloride | NA | 5 | 1J | 2J | 65-MW06 | 6/11 | NA | 0 |
| | | Acetone | NA | 700 | 5J | 7J | 65-MW06 | 7/11 | NA | 0 |
| | | Carbon Disulfide | NA | 700 | 5J | 5J | 65-MW04 | 1/11 | NA | 0 |
| | | 1,2-Dichloroethane | 5 | 0.38 | 2J | 2J | 65-MW07 | 8/11 | 0 | 8 |
| | | 2-Butanone | NA | 170 | 1J | 1J | 65-MW03, 05, & 06 | 3/11 | NA | 0 |
| | Semivolatiles | Naphthalene | NA | 21 | 3J | 3J | 65-DW04 | 1/11 | NA | 0 |
| | | di-n-Butylphthalate | NA | 700 | 2J | 6J | 65-MW07 | 3/11 | NA | 0 |
| | | bis(2-ethylhexyl)phthalate | 6 | 3 | 1J | 6J | 65-MW07 | 5/11 | 0 | 2 |
| | Pesticides | ND | NA | NA | NA | NA | NA | 0/11 | NA | NA |
| | PCBs | ND | NA | NA | NA | NA | NA | 0/11 | NA | NA |
| | Metals | Aluminum | 50-200[3] | NA | 40.3 | 421 | 65-MW06 | 7/11 | 6 | NA |
| | | Barium | 2000 | 2000 | 17.9 | 151 | 65-MW03 | 10/11 | 0 | 0 |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
ND - Not detected
PAH - Polynuclear aromatic hydrocarbon

[2] Comparison Criteria for groundwater are Federal Maximum Contaminant Levels (MCL) (Criteria I) and North Carolina Water Quality Standards (NCWQS) (Criteria II).
[3] Secondary MCL for aluminum, iron, and zinc; if MCL is a range, the lower concetration is used for comparison.

**TABLE 1 *(Continued)***

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Groundwater | Metals (continued) | Chromium | 100 | 50 | 10 | 10.2 | 65-MW01 | 2/11 | 0 | 0 |
| | | Cobalt | NA | NA | 20.1 | 52.4 | 65-DW02-02 | 4/11 | NA | NA |
| | | Iron | 300[3] | 300 | 41.9 | 6580 | 65-MW02 | 10/11 | 5 | 5 |
| | | Lead | 15[4] | 15 | 3.4 | 3.4 | 65-DW04 | 1/11 | 0 | 0 |
| | | Manganese | NA | 50 | 3 | 186 | 65-DW02-02 | 11/11 | NA | 5 |
| | | Nickel | 100 | 100 | 53.1 | 59.6 | 65-DW02-02 | 2/11 | 0 | 0 |
| | | Zinc | 5000[3] | 2100 | 11 | 58.9 | 65-DW02-02 | 10/11 | 0 | 0 |
| Surface Water[5] | Volatiles | Acetone | NA | NA | 5J | 5J | 65-SW04-01 | 1/2 | NA | NA |
| | | 1,2-Dichloroethane | 0.38 (EPA) | NA | 1J | 1J | 65-SW04-01 & SW05-01 | 2/2 | 2 | NA |
| | Semivolatiles | ND | NA | NA | NA | NA | NA | 0/2 | NA | NA |
| | Pesticides | ND | NA | NA | NA | NA | NA | 0/2 | NA | NA |
| | PCBs | ND | NA | NA | NA | NA | NA | 0/2 | NA | NA |
| | Metals | Aluminum | NA | 333.17 | 25800 | 25800 | 65-SW04-01 | 1/2 | NA | 1 |
| | | Barium | 1000 (NC) | 25.67 | 36.7 | 69.3 | 65-SW04-01 | 2/2 | 0 | 1 |
| | | Chromium (total) | 50[6] (EPA) | NA | 27.6 | 27.6 | 65-SW04-01 | 1/2 | 0 | 0 |
| | | Copper | 1300[7] (EPA) | NA | 41.1 | 41.1 | 65-SW04-01 | 1/2 | 0 | NA |
| | | Iron | 300[6] (EPA) | 575.67 | 348 | 7890 | 65-SW04-01 | 2/2 | 2 | 1 |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
ND - Not detected
PAH - Polynuclear aromatic hydrocarbon

[3] Secondary MCL for aluminum, iron, and zinc; if MCL is a range, the lower concetration is used for comparison.
[4] Federal Action Level for lead.
[5] Positive contaminant detections in surface water are compared to freshwater screening values for human health (water and organism consumption): EPA Region IV Water Quality Standards (EPA), 1995 or NCWQS (NC) (Criteria I), and upstream background concentrations from the White Oak River Basin Study (Criteria II).
[6] EPA Water Quality Criteria, 1991, Human Health Published Criteria (water and organism consumption).
[7] EPA Water Quality Criteria, 1991, Human Health Recalculated Values using IRIS, as of 9/90 (water and organism consumption).

**TABLE 1 *(Continued)***

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Surface Water | Metals (continued) | Lead | 50[6] (EPA) | NA | 45.8 | 45.8 | 65-SW04-01 | 1/2 | 0 | NA |
| | | Manganese | 200 (NC) | NA | 57.3 | 88.4 | 65-SW04-01 | 2/2 | 0 | 0 |
| | | Vanadium | NA | NA | 26.2 | 26.2 | 65-SW04-01 | 1/2 | NA | NA |
| | | Zinc | NA | NA | 33.6 | 144 | 65-SW04-01 | 2/2 | NA | NA |
| Sediment[8] | Volatiles | Acetone | NA | NA | 190J | 450J | 65-SD05-612 | 4/4 | NA | NA |
| | | Chloroform | NA | NA | 79J | 79J | 65-SD04-06 | 1/4 | NA | NA |
| | | 2-Butanone | NA | NA | 72J | 94J | 65-SD04-06 | 4/4 | NA | NA |
| | | Carbon Tetrachloride | NA | NA | 13J | 18J | 65-SD04-06 | 2/4 | NA | NA |
| | | Tetrachloroethene | NA | NA | 6J | 15J | 65-SD04-06 | 2/4 | NA | NA |
| | | Toluene | NA | NA | 3J | 7J | 65-SD04-06 | 3/4 | NA | NA |
| | Semivolatiles | Di-n-Butylphthalate | NA | NA | 940J | 1,600J | 65-SD04-612 | 4/4 | NA | NA |
| | Pesticides | beta-BHC | NA | 2.51 | 8.3NJ | 8.3NJ | 65-SD04-612 | 1/4 | NA | 1 |
| | | 4,4'-DDE | NA | 2.42 | 18J | 19NJ | 65-SD05-06 | 2/4 | NA | 2 |
| | | 4,4'-DDD | NA | 1.57 | 76J | 84J | 65-SD05-06 | 2/4 | NA | 2 |
| | Metals | Vanadium | NA | 17.57 | 40.5 | 40.5 | 65-SD04-06 | 1/4 | NA | 1 |
| | | Zinc | NA | 27.38 | 7.9 | 280J | 65-SD04-06 | 4/4 | NA | 3 |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
ND - Not detected
PAH - Polynuclear aromatic hydrocarbon

[6] EPA Water Quality Criteria, 1991, Human Health Published Criteria (water and organism consumption).
[7] EPA Water Quality Criteria, 1991, Human Health Recalculated Values using IRIS, as of 9/90 (water and organism consumption).
[8] There are no established criteria for sediment, therefore Criteria I is NA. Criteria II is the average upstream background sediment concetration from the White Oak River Basin Study.

**TABLE 1 *(Continued)***

**SUMMARY OF SITE CONTAMINATION**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | Site Contamination | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II |
| Fish Tissue[9] | Volatiles | Acetone | 14000 | NA | 5600J | 7900J | 65-FS05-LB01F | 2/4 | 0 | NA |
| | Pesticides | 4,4'-DDD | 13 | NA | 5.7J | 5.7J | 65-FS04-BG01F | 1/4 | 0 | NA |
| | Metals | Aluminum | 140 | NA | 0.99 | 0.99 | 65-FS05-LB01F | 1/4 | 0 | NA |
| | | Barium | 9.5 | NA | 0.21J | 0.21 | 65-FS04-BG01F | 1/4 | 0 | NA |
| | | Copper | 5.4 | NA | 0.46 | 0.49 | 65-FS04-BG01F | 2/4 | 0 | NA |
| | | Manganese | 2.7 | NA | 0.092J | 0.45J | 65-FS04-BG01F | 4/4 | 0 | NA |
| | | Mercury | 0.041 | NA | 0.051J | 0.3J | 65-FS05-LB01F | 4/4 | 4 | NA |
| | | Selenium | 0.68 | NA | 0.14 | 0.22 | 65-FS04-BG01F | 4/4 | 0 | NA |
| | | Thallium | $9.5 \times 10^{-3}$ | NA | 0.11 | 0.11 | 65-FS05-RS01F | 3/4 | 3 | NA |
| | | Zinc | 41 | NA | 5.8J | 8.4J | 65-FS05-BG01F | 4/4 | 0 | NA |

Notes:
Concentrations are presented in µg/Kg (ppb) for organics in fish tissue and in mg/Kg for metals in fish tissue (ppm).
NA - Not applicable

[9] Organics and Metals in fish tissue (fillet samples) are compared to EPA Region III RBCs for human ingestion of fish (Criteria I).
There is no Criteria II.

**TABLE 2**

**SUMMARY OF SITE CONTAMINATION - POST RI SAMPLING**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | | Site Contamination | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Criteria III | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II | Number of Detections Above Comparison Criteria III |
| Surface Soil[1] | Volatiles | | | | | | | | | | | |
| | | 1,1,2-Trichloro-1,2,2-trifluoroethane | 2.35E+08 | 5.60E+06 | NA | 3 J | 3 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | 1,2,4-Trichlorobenzene | 7.82E+04 | 6.50E+04 | NA | 0.6 J | 0.6 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | Toluene | 1.56E+06 | 5.20E+05 | NA | 0.7 J | 0.7 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | Xylenes (Total) | 1.56E+07 | 2.10E+05 | NA | 0.6 J | 0.6 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | Semivolatiles | | | | | | | | | | | |
| | | Caprolactam | 3.91E+06 | 3.10E+06 | NA | 220 J | 220 J | 65-IS03-00 | 1/2 | 0 | 0 | NA |
| | | Phenol | 4.69E+06 | 3.70E+06 | NA | 580 | 580 | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | bis(2-Ethylhexyl)phthalate | 4.56E+04 | 3.50E+04 | NA | 120 J | 330 J | 65-IS03-00 | 2/2 | 0 | 0 | NA |
| | Pesticides/PCBs | | | | | | | | | | | |
| | | 4,4'-DDD | 2.66E+03 | 2.40E+03 | NA | 4.8 J | 4.8 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | 4,4'-DDE | 1.88E+03 | 1.70E+03 | NA | 1.3 J | 1.3 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | 4,4'-DDT | 1.88E+03 | 1.70E+03 | NA | 3.4 J | 3.4 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | Alpha-BHC | 1.01E+02 | 9.00E+01 | NA | 1.3 J | 1.3 J | 65-IS03-00 | 1/2 | 0 | 0 | NA |
| | | Beta-BHC | 3.55E+02 | 3.20E+02 | NA | 3.4 J | 3.4 J | 65-IS03-00 | 1/2 | 0 | 0 | NA |
| | | Delta-BHC | NE | 3.20E+02 | NA | 1.3 J | 1.3 J | 65-IS03-00 | 1/2 | NA | 0 | NA |
| | | Endosulfan I | 4.69E+04 | 3.70E+04 | NA | 0.56 J | 0.56 J | 65-IS03-00 | 1/2 | 0 | 0 | NA |
| | | Endosulfan II | 4.69E+04 | 3.70E+04 | NA | 2.1 J | 2.1 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | p,p'-Methoxychlor | 3.91E+04 | 3.10E+04 | NA | 23 J | 23 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | Herbicides | | | | | | | | | | | |
| | | 2,4 5-TP (Silvex) | 7.82E+04 | 6.10E+04 | NA | 1.2 J | 3.4 J | 65-IS01-00 | 2/2 | 0 | 0 | NA |
| | | 2,4,5-T | 7.82E+04 | 6.10E+04 | NA | 1.2 J | 3.4 J | 65-IS01-00 | 2/2 | 0 | 0 | NA |
| | | 2,4-D | 7.82E+04 | 6.90E+04 | NA | 14 | 14 | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| | | 2,4-DB | 6.26E+04 | 4.90E+04 | NA | 34 J | 41 J | 65-IS01-00 | 2/2 | 0 | 0 | NA |
| | | 4-Nitrophenol | 6.26E+04 | 4.90E+04 | NA | 2.2 J | 10 J | 65-IS03-00 | 2/2 | 0 | 0 | NA |
| | | Dalapon | 2.35E+05 | 1.80E+05 | NA | 11 J | 14 J | 65-IS03-00 | 2/2 | 0 | 0 | NA |
| | | Dicamba | 2.35E+05 | NA | NA | 2.1 J | 2.1 J | 65-IS03-00 | 1/2 | 0 | NA | NA |
| | | Dichloroprop | NE | NA | NA | 22 J | 48 J | 65-IS03-00 | 2/2 | NA | NA | NA |
| | | Dinoseb | 7.82E+03 | 6.10E+03 | NA | 2.5 J | 5.1 J | 65-IS03-00 | 2/2 | 0 | 0 | NA |
| | | Pentachlorophenol | 5.32E+03 | 3.00E+03 | NA | 0.62 J | 0.62 J | 65-IS01-00 | 1/2 | 0 | 0 | NA |
| Surface Soil | Total Metals | | | | | | | | | | | |
| | | Aluminum | 7821 | 7600 | 5940 | 1490 | 9140 | 65-IS03-00 | 2/2 | 1 | 1 | 1 |
| | | Barium | 548 | 540 | 17.36 | 5.3 | 416 | 65-IS03-00 | 2/2 | 0 | 0 | 1 |
| | | Beryllium | 15643 | 15 | NA | 3.2 | 3.2 | 65-IS03-00 | 1/2 | 0 | 0 | NE |
| | | Calcium | NE | NA | 1397 | 296 | 10400 | 65-IS03-00 | 2/2 | NA | NA | 1 |
| | | Chromium | 235 | 210 | 6.693 | 2.2 | 10.1 | 65-IS03-00 | 2/2 | 0 | 0 | 1 |

**TABLE 2**

**SUMMARY OF SITE CONTAMINATION - POST RI SAMPLING**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | | Site Contamination | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Criteria III | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II | Number of Detections Above Comparison Criteria III |
| Surface Soil | Total Metals (continued) | Cobalt | 156 | 470 | 2.348 | 5.9 | 5.9 | 65-IS03-00 | 1/2 | 0 | 0 | 0 |
| | | Copper | 313 | 290 | 7.2 | 0.94 | 43.1 | 65-IS03-00 | 2/2 | 0 | 0 | 1 |
| | | Iron | 2346 | 2300 | 3755 | 994 | 9150 | 65-IS03-00 | 2/2 | 1 | 1 | 1 |
| | | Magnesium | NE | NA | 205.8 | 62.4 J | 951 J | 65-IS03-00 | 2/2 | NA | NA | 1 |
| | | Manganese | 1095 | 180 | 18.497 | 10.2 | 66.8 | 65-IS03-00 | 2/2 | 0 | 0 | 1 |
| | | Mercury | NE | 2.3 | 0.078 | 0.26 | 0.26 | 65-IS03-00 | 1/2 | NA | 0 | 1 |
| | | Nickel | 156 | 160 | 3.43 | 0.65 | 43.6 | 65-IS03-00 | 2/2 | 0 | 0 | 1 |
| | | Potassium | NE | NA | 200 | 1460 | 1460 | 65-IS03-00 | 1/2 | NA | NA | 1 |
| | | Selenium | 39 | 39 | NA | 2.2 J | 2.2 J | 65-IS03-00 | 1/1 | 0 | 0 | NE |
| | | Sodium | NE | NA | 59.3 | 138 J | 138 J | 65-IS03-00 | 1/2 | NA | NA | 1 |
| | | Vanadium | 55 | 55 | 11.63 | 2.1 J | 176 | 65-IS03-00 | 2/2 | 1 | 1 | 1 |
| | | Zinc | 2346 | 2300 | 13.88 | 13.8 | 13.8 | 65-IS03-00 | 1/2 | 0 | 0 | 0 |
| Subsurface Soil[(1)] | Volatiles | | | | | | | | | | | |
| | | 1,1,2-Trichloro-1,2,2-trifluoroethane | 2.35E+08 | 5.60E+06 | NA | 3 J | 4 J | 65-IS02-01 | 2/4 | 0 | 0 | NA |
| | | 1,2,4-Trichlorobenzene | 7.82E+04 | 6.50E+04 | NA | 0.7 J | 0.7 J | 65-IS02-01 | 1/4 | 0 | 0 | NA |
| | | Chlorobenzene | 1.56E+05 | 1.50E+04 | NA | 0.6 J | 0.6 J | 65-IS01-03 | 1/4 | 0 | 0 | NA |
| | | Toluene | 1.56E+06 | 5.20E+05 | NA | 1 J | 2 J | 65-IS01-03 | 2/4 | 0 | 0 | NA |
| | | Xylenes (Total) | 1.56E+07 | 2.10E+05 | NA | 1 J | 1 J | 65-IS01-03 | 1/4 | 0 | 0 | NA |
| | Semivolatiles | | | | | | | | | | | |
| | | Anthracene | 2.35E+06 | 2.20E+06 | NA | 25 J | 25 J | 65-IS02-01D | 1/4 | 0 | 0 | NA |
| | | Benzo(a)anthracene | 8.75E+02 | 6.20E+02 | NA | 82 J | 82 J | 65-IS02-01D | 1/4 | 0 | 0 | NA |
| | | Benzo(a)pyrene | 8.75E+01 | 6.20E+01 | NA | 45 J | 45 J | 65-IS02-01D | 1/4 | 0 | 0 | NA |
| | | Benzo(b)fluoranthene | 8.75E+02 | 6.20E+02 | NA | 110 J | 110 J | 65-IS02-01D | 1/4 | 0 | 0 | NA |
| | | Benzo(k)fluoranthene | 8.75E+03 | 6.20E+03 | NA | 54 J | 54 J | 65-IS02-01D | 1/4 | 0 | 0 | NA |
| | | Caprolactam | 3.91E+06 | 3.10E+06 | NA | 53 J | 79 J | 65-IS02-01D | 2/4 | 0 | 0 | NA |
| | | Carbazole | 3.19E+04 | 2.40E+04 | NA | 18 J | 18 J | 65-IS02-01D | 1/4 | 0 | 0 | NA |
| | | Chrysene | 8.75E+04 | 6.20E+04 | NA | 100 J | 100 J | 65-IS02-01D | 1/4 | 0 | 0 | NA |
| | | Fluoranthene | 3.13E+05 | 2.30E+05 | NA | 33 J | 110 J | 65-IS02-01D | 2/4 | 0 | 0 | NA |
| | | Pyrene | 2.35E+05 | 2.30E+05 | NA | 22 J | 94 J | 65-IS02-01D | 2/4 | 0 | 0 | NA |
| | | bis(2-Ethylhexyl)phthalate | 4.56E+04 | 3.50E+04 | NA | 170 J | 24000 D | 65-IS02-01 | 4/4 | 0 | 0 | NA |
| | Pesticides | | | | | | | | | | | |
| | | 4,4'-DDD | 2.66E+03 | 2.40E+03 | NA | 0.4 J | 0.64 J | 65-IS03-03 | 2/4 | 0 | 0 | NA |
| | | 4,4'-DDE | 1.88E+03 | 1.70E+03 | NA | 0.23 J | 1.3 J | 65-IS02-01 | 3/4 | 0 | 0 | NA |
| | | 4,4'-DDT | 1.88E+03 | 1.70E+03 | NA | 0.49 J | 3.2 J | 65-IS02-01 | 4/4 | 0 | 0 | NA |
| | | Aldrin | 3.76E+01 | 2.90E+01 | NA | 0.086 J | 0.086 J | 65-IS03-03 | 1/4 | 0 | 0 | NA |
| | | Alpha chlordane | 1.8E+00 | 1.60E+03 | NA | 0.12 J | 0.44 J | 65-IS02-01 | 3/4 | 0 | 0 | NA |

**TABLE 2**

**SUMMARY OF SITE CONTAMINATION - POST RI SAMPLING**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | | Site Contamination | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Criteria III | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II | Number of Detections Above Comparison Criteria III |
| Subsurface Soil | Pesticides (continued) | Alpha-BHC | 1.01E+02 | 9.00E+01 | NA | 0.4 J | 0.42 J | 65-IS03-03 | 2/4 | 0 | 0 | NA |
| | | Beta-BHC | 3.55E+02 | 3.20E+02 | NA | 0.19 J | 0.54 J | 65-IS01-03 | 2/4 | 0 | 0 | NA |
| | | Delta-BHC | NE | 3.20E+02 | NA | 0.12 J | 0.12 J | 65-IS01-03, 65-IS03-03 | 2/4 | NA | 0 | NA |
| | | Dieldrin | 3.99E+01 | 3.00E+01 | NA | 0.51 J | 0.51 J | 65-IS03-03 | 1/4 | 0 | 0 | NA |
| | | Endosulfan II | 4.69E+04 | 3.70E+04 | NA | 0.065 J | 0.79 J | 65-IS02-01D | 3/4 | 0 | 0 | NA |
| | | Endosulfan sulfate | 4.69E+02 | 3.70E+04 | NA | 0.18 J | 0.18 J | 65-IS03-03 | 1/4 | 0 | 0 | NA |
| | | Endrin | 2.35E+03 | 1.80E+03 | NA | 0.086 J | 0.21 J | 65-IS01-03 | 2/4 | 0 | 0 | NA |
| | | Endrin aldehyde | 2.35E+01 | 1.80E+03 | NA | 0.066 J | 0.066 J | 65-IS03-03 | 1/4 | 0 | 0 | NA |
| | | Endrin ketone | 2.35E+01 | 1.80E+03 | NA | 0.42 J | 0.42 J | 65-IS03-03 | 1/4 | 0 | 0 | NA |
| | | Gamma chlordane | 1.8E+00 | 1.60E+03 | NA | 1.6 J | 1.8 J | 65-IS02-01 | 2/4 | 0 | 0 | NA |
| | | Gamma-BHC (Lindane) | 4.91E+02 | 4.40E+02 | NA | 0.055 J | 0.055 J | 65-IS03-03 | 1/4 | 0 | 0 | NA |
| | | Heptachlor | 1.42E+02 | 1.10E+02 | NA | 0.038 J | 0.2 J | 65-IS01-03 | 2/4 | 0 | 0 | NA |
| | | Heptachlor epoxide | 7.02E+01 | 5.30E+01 | NA | 0.047 J | 0.047 J | 65-IS03-03 | 1/4 | 0 | 0 | NA |
| | | p,p'-Methoxychlor | 3.91E+04 | 3.10E+04 | NA | 1.3 J | 33 J | 65-IS01-03 | 3/4 | 0 | 0 | NA |
| | Herbicides | | | | | | | | | | | |
| | | 2,4-D | 7.82E+04 | 6.90E+04 | NA | 5.4 J | 11 J | 65-IS02-01D | 2/4 | 0 | 0 | NA |
| | | 2,4-DB | 6.26E+04 | 4.90E+04 | NA | 21 J | 31 | 65-IS01-03 | 3/4 | 0 | 0 | NA |
| | | 4-Nitrophenol | 6.26E+04 | 4.90E+04 | NA | 2.1 J | 5.3 J | 65-IS02-01 | 3/4 | 0 | 0 | NA |
| | | Dalapon | 2.35E+05 | 1.80E+05 | NA | 4.7 J | 33 J | 65-IS02-01 | 4/4 | 0 | 0 | NA |
| | | Dichloroprop | NE | NA | NA | 19 J | 23 J | 65-IS02-01D | 3/4 | NA | NA | NA |
| | | Dinoseb | 7.82E+03 | 6.10E+03 | NA | 2.6 J | 2.7 J | 65-IS02-01D | 3/4 | 0 | 0 | NA |
| | | Pentachlorophenol | 5.32E+03 | 3.00E+03 | NA | 0.24 J | 0.29 J | 65-IS02-01D | 2/4 | 0 | 0 | NA |
| Subsurface Soil | Total Metals | | | | | | | | | | | |
| | | Aluminum | 7821 | 7600 | 7375 | 1350 | 2690 | 65-IS02-01D | 4/4 | 0 | 0 | 0 |
| | | Arsenic | 0.0426 | 0.390 | 1.97 | 0.32 J | 0.66 J | 65-IS02-01D | 4/4 | 4 | 2 | 0 |
| | | Barium | 548 | 540 | 14.20 | 6.3 | 7.7 | 65-IS02-01 | 4/4 | 0 | 0 | 0 |
| | | Calcium | NE | NA | 392 | 125 | 945 | 65-IS02-01D | 4/4 | NA | NA | 2 |
| | | Chromium | 235 | 210 | 12.56 | 2.2 | 2.8 | 65-IS01-03 | 4/4 | 0 | 0 | 0 |
| | | Copper | 313 | 290 | 2.416 | 0.83 | 1.5 | 65-IS01-03 | 4/4 | 0 | 0 | 0 |
| | | Iron | 2346 | 2300 | 7252 | 786 | 1530 | 65-IS01-03 | 4/4 | 0 | 0 | 0 |
| | | Lead | 400 | 400 | 8.327 | 2.3 | 2.3 | 65-IS01-03 | 1/4 | 0 | 0 | 0 |
| | | Magnesium | NE | NA | 261 | 49.8 J | 108 J | 65-IS02-01D | 4/4 | NA | NA | 0 |
| | | Manganese | 1095 | 180 | 7.919 | 13.7 | 18.2 | 65-IS01-03 | 3/4 | 0 | | 0 |
| | | Nickel | 156 | 160 | 3.714 | 0.81 | 0.95 | IS03-03 | 4/4 | 0 | 0 | 0 |
| | | Sodium | NE | NA | 52.7 | 27 J | 320 | 65-IS02-01D | 2/4 | NA | NA | 1 |

**TABLE 2**

**SUMMARY OF SITE CONTAMINATION - POST RI SAMPLING**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | | Site Contamination | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Criteria III | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II | Number of Detections Above Comparison Criteria III |
| Subsurface Soil | Total Metals (continued) | Vanadium | 55 | 55 | 13.45 | 1.8 J | 3.5 | 65-IS02-01D | 4/4 | 0 | 0 | 0 |
| Groundwater[2] | Volatiles | | | | | | | | | | | |
| | | 1,1,2-Trichloro-1,2,2-trifluoroethane | NE | 210000 | NA | 0.2 J | 0.2 J | 65-IS03-GW01 | 1/3 | NA | 0 | NA |
| | | Acetone | NE | 700 | NA | 4 J | 4 J | 65-IS02-GW01 | 1/2 | NA | 0 | NA |
| | | Carbon disulfide | NE | NE | NA | 0.2 J | 0.2 J | 65-IS02-GW01D | 1/4 | NA | NA | NA |
| | | Ethylbenzene | 700 | 29 | NA | 0.2 J | 0.2 J | IS02-GW01D | 2/4 | 0 | 0 | NA |
| | | Methylene chloride | NE | 5 | NA | 0.7 | 0.7 | 65-IS01-GW01 | 1/4 | NA | 0 | NA |
| | Total Metals | | | | | | | | | | | |
| | | Aluminum | NE | NE | NA | 3530 | 22200 | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Barium | 2000 | 2000 | NA | 33.2 | 75 | 65-IS01-GW01 | 4/4 | 0 | 0 | NA |
| | | Calcium | NE | NE | NA | 13900 | 29100 | 65-IS03-GW01 | 4/4 | NA | NA | NA |
| | | Chromium | 100 | 50 | NA | 4.4 J | 27.9 | 65-IS01-GW01 | 4/4 | 0 | 0 | NA |
| | | Cobalt | NE | NE | NA | 0.47 J | 4.7 J | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Copper | NE | 1000 | NA | 2.6 J | 8.6 | 65-IS01-GW01 | 3/4 | NA | 0 | NA |
| | | Iron | NE | 300 | NA | 5270 | 13200 | 65-IS01-GW01 | 4/4 | NA | 4 | NA |
| | | Lead | NE | 15 | NA | 2.1 J | 14.5 | 65-IS01-GW01 | 4/4 | NA | 0 | NA |
| | | Magnesium | NE | NE | NA | 1490 | 2690 | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Manganese | NE | 50 | NA | 85.8 | 166 | 65-IS01-GW01 | 4/4 | NA | 4 | NA |
| | | Mercury | 2 | 1 | NA | 0.11 J | 0.11 J | 65-IS01-GW01 | 1/4 | 0 | 0 | NA |
| | | Nickel | 100.0 | 100.0 | NA | 5.8 | 14.3 | 65-IS01-GW01 | 3/4 | 0 | 0 | NA |
| | | Potassium | NE | NE | NA | 1100 | 1660 | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Selenium | 50 | 50 | NA | 2.5 J | 2.5 J | 65-IS01-GW01 | 1/4 | 0 | 0 | NA |
| | | Sodium | NE | NE | NA | 8800 J | 13300 J | 65-IS03-GW01 | 4/4 | NA | NA | NA |
| | | Vanadium | NE | NE | NA | 5.7 J | 18 J | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Zinc | NE | 2100 | NA | 2.7 J | 15.2 J | 65-IS01-GW01 | 3/4 | NA | 0 | NA |
| | Dissolved Metals | | | | | | | | | | | |
| | | Aluminum | NE | NE | NA | 3530 | 22200 | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Antimony | 6 | NE | NA | 1.8 J | 1.8 J | 65-IS02-GW01D | 1/4 | 0 | NA | NA |
| | | Barium | 2000 | 2000 | NA | 33.2 | 75 | 65-IS01-GW01 | 4/4 | 0 | 0 | NA |
| | | Calcium | NE | NE | NA | 13900 | 29100 | 65-IS03-GW01 | 4/4 | NA | NA | NA |
| | | Chromium | 100 | 50 | NA | 4.4 J | 27.9 | 65-IS01-GW01 | 4/4 | 0 | 0 | NA |
| | | Iron | NE | 300 | NA | 5270 | 13200 | 65-IS01-GW01 | 4/4 | NA | 4 | NA |
| | | Lead | NE | 15 | NA | 2.1 J | 14.5 | 65-IS01-GW01 | 4/4 | NA | 0 | NA |
| | | Magnesium | NE | NE | NA | 1490 | 2690 | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Manganese | NE | 50 | NA | 85.8 | 166 | 65-IS01-GW01 | 4/4 | NA | 4 | NA |

**TABLE 2**

**SUMMARY OF SITE CONTAMINATION - POST RI SAMPLING**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | | Site Contamination | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Criteria III | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II | Number of Detections Above Comparison Criteria III |
| Groundwater | Dissolved Metals (continued) | Potassium | NE | NE | NA | 1100 | 1660 | 65-IS01-GW01 | 4/4 | NA | NA | NA |
| | | Sodium | NE | NE | NA | 8800 J | 13300 J | 65-IS03-GW01 | 4/4 | NA | NA | NA |
| Surface Water[3] | Volatiles | | | | | | | | | | | |
| | | Acetone | NE | NE | NA | 21 J | 21 J | 65-SW01 | 1/1 | NA | NA | NA |
| | Total Metals | | | | | | | | | | | |
| | | Aluminum | NE | NE | 333 | 421 | 9250 | 65-SW01 | 3/3 | NA | NA | 3 |
| | | Antimony | 14 | NE | NA | 2.6 J | 2.6 J | 65-SW01 | 1/3 | 0 | NA | NA |
| | | Arsenic | 0.018 | 50 * | NA | 2.8 J | 2.8 J | 65-SW01 | 1/3 | 1 | 0 | NA |
| | | Barium | NE | NE | 26 | 32.5 | 164 | 65-SW01 | 3/3 | NA | NA | 3 |
| | | Calcium | NE | NE | 17567 | 25400 | 30100 | 65-SW01 | 3/3 | NA | NA | 3 |
| | | Chromium | 170 | 50 * | NA | 1.6 J | 12.6 | 65-SW01 | 3/3 | 0 | 0 | NA |
| | | Cobalt | NE | NE | NA | 0.93 J | 0.93 J | 65-SW01 | 1/3 | NA | NA | NA |
| | | Copper | 1300 | 7 * (AL) | NA | 1.6 J | 40.6 | 65-SW01 | 2/3 | 0 | 1 | NA |
| | | Iron | 300 | 1000* (AL) | 576 | 10100 | 54800 | 65-SW01 | 3/3 | 3 | 3 | 3 |
| | | Lead | 50 | 25 * | NA | 2.3 J | 68.9 | 65-SW01 | 3/3 | 1 | 1 | NA |
| | | Magnesium | NE | NE | 1745 | 2380 | 3020 | 65-SW01 | 3/3 | NA | NA | 3 |
| | | Manganese | 50 | NE | NA | 196 | 332 | 65-SW01 | 3/3 | 3 | NA | NA |
| | | Nickel | 610 | 88 | NA | 5.5 | 5.5 | 65-SW01 | 1/3 | 0 | 0 | NA |
| | | Potassium | NE | NE | NA | 1030 | 1890 | 65-SW01 | 3/3 | NA | NA | NA |
| | | Sodium | NE | NE | 9830 | 12400 J | 12900 J | 65-SW02D | 3/3 | NA | NA | 3 |
| | | Thallium | 2 | NE | NA | 6.4 J | 6.4 J | 65-SW01 | 1/3 | 1 | NA | NA |
| | | Vanadium | NE | NE | NA | 2.2 J | 19.8 J | 65-SW01 | 2/3 | NA | NA | NA |
| | | Zinc | 9100 | 50 * (AL) | NA | 95.3 | 95.3 | 65-SW01 | 1/3 | 0 | 1 | NA |
| Sediment[4] | Volatiles | | | | | | | | | | | |
| | | 1,1,2-Trichloro-1,2,2-trifluoroethane | NE | NA | NA | 5 J | 5 J | 65-SD01 | 1/3 | NA | NA | NA |
| | | 1,4-Dichlorobenzene | NE | NA | NA | 0.9 J | 0.9 J | 65-SD01 | 1/3 | NA | NA | NA |
| | | 2-Butanone | NE | NA | NA | 4 J | 4 J | 65-SD02 | 1/3 | NA | NA | NA |
| | | Acetone | NE | NA | NA | 16 J | 16 J | 65-SD02 | 1/2 | NA | NA | NA |
| | | Methylene chloride | NE | NA | NA | 2 J | 2 J | 65-SD02 | 1/3 | NA | NA | NA |
| | | Toluene | NE | NA | NA | 4 J | 21 | 65-SD02 | 3/3 | NA | NA | NA |
| | Semivolatiles | | | | | | | | | | | |
| | | 4,6-Dinitro-2-methylphenol | NE | NA | NA | 1100 | 1100 | 65-SD02 | 1/3 | NA | NA | NA |
| | | 4-Methylphenol | NE | NA | NA | 140 J | 140 J | 65-SD02 | 1/3 | NA | NA | NA |
| | | Benzaldehyde | NE | NA | NA | 110 J | 110 J | 65-SD01 | 1/3 | NA | NA | NA |
| | | bis(2-Ethylhexyl)phthalate | 1.82E+02 | NA | NA | 98 J | 160 J | 65-SD01 | 3/3 | 0 | NA | NA |
| | | | | | | | | | | | | |

**TABLE 2**

**SUMMARY OF SITE CONTAMINATION - POST RI SAMPLING**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | | Site Contamination | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Criteria III | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II | Number of Detections Above Comparison Criteria III |
| Sediment | Pesticides/PCBs | | | | | | | | | | | |
| | | 4,4'-DDD | 1.22E+00 | 2 | NA | 28 | 64 | 65-SD01D | 3/3 | 3 | 3 | NA |
| | | 4,4'-DDE | 2.00E+00 | 2 | NA | 24 | 30 | 65-SD01 | 3/3 | 3 | 3 | NA |
| | | 4,4'-DDT | 1.00E+00 | 2 | NA | 5.6 J | 8 J | 65-SD02 | 3/3 | 3 | 3 | NA |
| | | Aldrin | NE | 1 | NA | 0.2 J | 0.2 J | 65-SD02 | 1/3 | NA | 0 | NA |
| | | Alpha chlordane | 5.00E-01 | 1 | NA | 0.45 J | 0.52 J | 65-SD02 | 2/3 | 1 | 0 | NA |
| | | Alpha-BHC | NE | NA | NA | 0.2 J | 0.2 J | 65-SD02 | 1/3 | NA | NA | NA |
| | | Beta-BHC | NE | 3 | NA | 0.29 J | 0.29 J | 65-SD02 | 1/3 | NA | 0 | NA |
| | | Dieldrin | 2.00E-02 | 2 | NA | 0.13 J | 1.3 J | 65-SD01D | 2/3 | 2 | 0 | NA |
| | | Endosulfan I | NE | NA | NA | 0.076 J | 0.076 J | 65-SD02 | 1/3 | NA | NA | NA |
| | | Endosulfan sulfate | NE | NA | NA | 0.31 J | 20 J | 65-SD01D | 3/3 | NA | NA | NA |
| | | Endrin | 2.00E-02 | NA | NA | 0.16 J | 0.66 J | 65-SD01D | 2/3 | 2 | NA | NA |
| | | Endrin aldehyde | 2.00E-02 | 2 | NA | 2.1 J | 4.1 J | 65-SD01D | 2/3 | 2 | 2 | NA |
| | | Endrin ketone | 2.00E-02 | NA | NA | 4.9 J | 16 J | 65-SD02 | 3/3 | 3 | NA | NA |
| | | Gamma chlordane | 5.00E-01 | 1 | NA | 0.23 J | 0.94 J | 65-SD01D | 2/3 | 1 | 0 | NA |
| | | Gamma-BHC (Lindane) | 3.20E-01 | NA | NA | 0.04 J | 0.04 J | 65-SD02 | 1/3 | 0 | NA | NA |
| | | Heptachlor | NE | 1 | NA | 0.03 J | 0.59 J | 65-SD01 | 2/3 | NA | 0 | NA |
| | | Heptachlor epoxide | NE | NA | NA | 0.063 J | 2.3 J | 65-SD01D | 3/3 | NA | NA | NA |
| | | p,p'-Methoxychlor | NE | 10 | NA | 52 J | 110 J | 65-SD01D | 3/3 | NA | 3 | NA |
| | Herbicides | | | | | | | | | | | |
| | | 2,4 5-TP (Silvex) | NE | NA | NA | 0.78 J | 1.2 J | 65-SD02 | 3/3 | NA | NA | NA |
| | | 2,4,5-T | NE | NA | NA | 0.78 J | 1.2 J | 65-SD02 | 3/3 | NA | NA | NA |
| | | 2,4-D | NE | NA | NA | 6.5 J | 16 J | 65-SD01D | 3/3 | NA | NA | NA |
| | | 2,4-DB | NE | NA | NA | 39 J | 68 J | 65-SD02 | 3/3 | NA | NA | NA |
| | | 4-Nitrophenol | NE | NA | NA | 8.4 | 19 J | 65-SD01D | 3/3 | NA | NA | NA |
| | | Dalapon | NE | NA | NA | 10 J | 11 J | SD02 | 3/3 | NA | NA | NA |
| | | Dicamba | NE | NA | NA | 1.7 J | 6.1 J | 65-SD01D | 3/3 | NA | NA | NA |
| | | Dichloroprop | NE | NA | NA | 35 J | 43 J | 65-SD01D | 3/3 | NA | NA | NA |
| | | Dinoseb | NE | NA | NA | 4.3 J | 5 J | 65-SD01 | 3/3 | NA | NA | NA |
| | | Pentachlorophenol | NE | NA | NA | 0.85 J | 1.6 J | 65-SD02 | 3/3 | NA | NA | NA |
| | Total Metals | | | | | | | | | | | |
| | | Aluminum | NE | 1166 | NA | 7510 | 13800 | 65-SD02 | 3/3 | NA | 3 | NA |
| | | Antimony | 2.00E+00 | NA | NA | 1.6 J | 1.6 J | 65-SD01 | 1/3 | 0 | NA | NA |
| | | Arsenic | NE | 0.37 | NA | 1.7 | 2 | 65-SD01 | 3/3 | NA | 3 | NA |
| | | Barium | 7.24E+00 | 6 | NA | 24.1 | 48.2 | 65-SD02 | 3/3 | 3 | 3 | NA |
| | | Calcium | NE | 1967 | NA | 790 | 2170 | 65-SD02 | 3/3 | NA | 1 | NA |

**TABLE 2**

**SUMMARY OF SITE CONTAMINATION - POST RI SAMPLING**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Media | Fraction | Detected Organics/Inorganics | Comparison Criteria | | | Site Contamination | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Criteria I | Criteria II | Criteria III | Min. Conc. | Max. Conc. | Location(s) of Maximum Concentration | Detection Frequency | Number of Detections Above Comparison Criteria I | Number of Detections Above Comparison Criteria II | Number of Detections Above Comparison Criteria III |
| Sediment | Total Metals (continued) | Chromium | 5.23E+01 | 1.86 | NA | 9.3 | 17.7 | 65-SD02 | 3/3 | 0 | 3 | NA |
| | | Cobalt | NE | NA | NA | 0.61 J | 1.4 | 65-SD02 | 3/3 | NA | NA | NA |
| | | Copper | 1.87E+01 | 0.75 | NA | 20.5 | 43 | 65-SD02 | 3/3 | 3 | 3 | NA |
| | | Iron | NE | 434 | NA | 3370 | 6990 | 65-SD02 | 3/3 | NA | 3 | NA |
| | | Lead | 3.02E+01 | 0.79 | NA | 36.6 | 75.5 | 65-SD02 | 3/3 | 3 | 3 | NA |
| | | Magnesium | NE | 45 | NA | 217 J | 487 J | 65-SD02 | 3/3 | NA | 3 | NA |
| | | Manganese | NE | 3.63 | NA | 18.6 | 46 | 65-SD02 | 2/3 | NA | 2 | NA |
| | | Mercury | 1.30E-01 | 0.14 | NA | 0.069 | 0.11 | 65-SD01D | 3/3 | 0 | 0 | NA |
| | | Nickel | 1.59E+01 | NA | NA | 2.8 | 5.7 | 65-SD02 | 3/3 | 0 | NA | NA |
| | | Potassium | NE | NA | NA | 234 | 498 | 65-SD02 | 3/3 | NA | NA | NA |
| | | Selenium | NE | 0.19 | NA | 0.42 J | 0.42 J | 65-SD01D | 1/1 | NA | 1 | NA |
| | | Sodium | NE | NA | NA | 1370 | 1370 | 65-SD01 | 1/3 | NA | NA | NA |
| | | Vanadium | NE | 1.52 | NA | 10 | 16.9 | 65-SD02 | 3/3 | NA | 3 | NA |
| | | Zinc | 1.24E+02 | 5.11 | NA | 43.8 | 97.6 | 65-SD02 | 3/3 | 0 | 3 | NA |

Notes:
Concentrations are presented in µg/Kg for organics in soil and sediment and in µg/L for all water contaminants (ppb); metal concentrations for soil and sediment are presented in mg/Kg (ppm).
NA - Not applicable
NE - Not established

(1) Organics and Metals in both surface and subsurface soils are compared to EPA Region III Risk Based Concentrations (RBCs) for a residential area (Criteria I) (EPA updated 5/8/2001), EPA Region IX Preliminary Remediation Goals (PRGs) for a residential area (Criteria II) (EPA 11/01/00), and two times base background concentrations for MCB, Camp Lejeune (Criteria III) (Metals only). For lead, the residential action level in soil is used (USEPA 1994).

(2) Comparison Criteria for groundwater are Federal Maximum Contaminant Levels (MCL) (Criteria I) and North Carolina Water Quality Standards (NCWQS) (Criteria II).

(3) Positive contaminant detections in surface water are compared to EPA Tier II freshwater screening values for human health (water and organism consumption) (Criteria I), North Carolina Water Quality Standards (NCWQS) for fresh surface water (Criteria II), and the average upstream background surface water concentrations from the White Oak River Basin Study (Criteria III). NCWQS were human health values. If human health values were not available, values for aquatic life were used (NCDENR, 1988).

* Human health value not available, value is for aquatic life

(AL) Value represents action level

(4) There are no established human health criteria for sediment. Comparison Criteria are EPA Region IV Ecological Screening Levels for freshwater (EPA 2000) (Criteria I), and the average upstream background sediment concentration from the White Oak River Basin Study (Criteria II).

**TABLE 3**

**SUMMARY OF COPCs IN EACH MEDIA OF CONCERN**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Contaminant | Surface Soil | | Subsurface Soil | | Groundwater | | Surface Water | | Sediment | | Fish Tissue | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatiles** | | | | | | | | | | | | |
| Methylene Chloride | ! | | | | ! | | | | | | | |
| Acetone | ! | | ! | | ! | | ! | | ! | | ! | |
| Carbon disulfide | | | ! | | ! | X | | | | | | |
| Chloroform | | | | | | | | | ! | | | |
| 1,2-Dichloroethane | | | | | ! | | ! | | | | | |
| 2-Butanone | | | ! | | ! | | | | ! | | | |
| Carbon Tetrachloride | | | | | | | | | ! | | | |
| Trichloroethene | ! | | ! | | | | | | | | | |
| Tetrachloroethene | | | | | | | | | ! | | | |
| Toluene | ! | | ! | | | | | | ! | | | |
| Ethylbenzene | ! | | | | | | | | | | | |
| Xylenes (Total) | ! | | ! | | | | | | | | | |
| **Semivolatiles** | | | | | | | | | | | | |
| Naphthalene | | | ! | | ! | | | | | | | |
| 2-Methylnaphthalene | | | ! | | | | | | | | | |
| Acenaphthene | ! | | ! | | | | | | | | | |
| 2,4-Dinitrophenol | ! | | | | | | | | | | | |
| Dibenzofuran | ! | | ! | | | | | | | | | |
| Fluorene | ! | | ! | | | | | | | | | |
| Phenanthrene | ! | | ! | | | | | | | | | |
| Anthracene | ! | | ! | | | | | | | | | |
| Carbazole | ! | | ! | | | | | | | | | |
| Di-n-butylphthalate | ! | | ! | | ! | | | | ! | | | |
| Fluoranthene | ! | | ! | | | | | | | | | |
| Pyrene | ! | | ! | | | | | | | | | |
| Benzo(a)anthracene | ! | | ! | X | | | | | | | | |
| Chrysene | ! | | ! | | | | | | | | | |
| bis(2-Ethylhexyl)phthalate | ! | | ! | | ! | | | | | | | |
| Benzo(b)fluoranthene | ! | | ! | | | | | | | | | |
| Benzo(k)fluoranthene | ! | | ! | | | | | | | | | |
| Benzo(a)pyrene | ! | X | ! | X | | | | | | | | |
| Ideno(1,2,3-cd)pyrene | ! | | ! | | | | | | | | | |
| Dibenzo(a,h)anthracene | ! | X | | | | | | | | | | |
| Benzo(g,h,i)perylene | ! | | ! | | | | | | | | | |

Notes:

**!** = Detected in media; compared to relevant criteria and standards.
X = Selected as a COPC in the human health risk assessment.

**TABLE 3 *(Continued)***

**SUMMARY OF COPCs IN EACH MEDIA OF CONCERN**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Contaminant | Surface Soil | | Subsurface Soil | | Groundwater | | Surface Water | | Sediment | | Fish Tissue | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pesticide/PCBs** | | | | | | | | | | | | |
| beta-BHC | | | | | | | | | ! | | | |
| Heptachlor Epoxide | ! | | | | | | | | | | | |
| Endosulfan I | | | ! | | | | | | | | | |
| 4,4'-DDE | ! | | ! | | | | | | ! | | | |
| Endosulfan II | ! | | | | | | | | | | | |
| 4,4'-DDD | ! | | ! | | | | | | ! | | ! | |
| 4,4'-DDT | ! | | ! | | | | | | | | | |
| Endrin Aldehyde | | | ! | | | | | | | | | |
| Alpha Chlordane | | | ! | | | | | | | | | |
| Gamma Chlordane | | | ! | | | | | | | | | |
| Aroclor-1260 | ! | | | | | | | | | | | |
| **Inorganics** | | | | | | | | | | | | |
| Aluminum | ! | | ! | X | ! | | ! | X | ! | X | ! | |
| Antimony | | | ! | X | | | | | ! | X | | |
| Arsenic | | | ! | X | | | | | | | | |
| Barium | ! | | ! | | ! | | ! | X | ! | | ! | |
| Beryllium | | | | | | | | | | | | |
| Cadmium | | | ! | | | | | | | | | |
| Calcium | ! | | ! | | ! | | ! | | ! | | ! | |
| Chromium | ! | | ! | | ! | | ! | X | ! | X | | |
| Cobalt | | | ! | | ! | | | | ! | | | |
| Copper | ! | | ! | X | | | ! | X | ! | | ! | |
| Iron | ! | X | ! | X | ! | X | ! | | ! | X | | |
| Lead | ! | | ! | X | ! | | ! | X | ! | | | |
| Magnesium | ! | | ! | | ! | | ! | | ! | | ! | |
| Manganese | ! | X | ! | X | ! | X | ! | X | ! | | ! | |
| Mercury | | | | | | | | | | | ! | X |
| Nickel | ! | | ! | X | ! | | | | | | | |
| Potassium | ! | | ! | | ! | | ! | | ! | | ! | |
| Selenium | | | ! | | | | | | | | ! | |
| Silver | | | ! | | | | | | | | | |
| Sodium | ! | | ! | | ! | | ! | | ! | | ! | |
| Thallium | ! | X | ! | X | | | | | | | ! | X |
| Vanadium | ! | | ! | | | | ! | X | ! | | | |
| Zinc | ! | | ! | | ! | | ! | X | ! | | ! | |

Notes:

**!** = Detected in media; compared to relevant criteria and standards.
X = Selected as a COPC in the human health risk assessment.

**TABLE 4**

**ECOLOGICAL CONTAMINANTS OF CONCERN IN EACH MEDIA**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Contaminant | Surface Water | | Sediment | Surface Soil | Fish | |
|---|---|---|---|---|---|---|
| | Aquatic Receptors | Terrestrial Receptors | | | Fillet | Whole Body |
| **Volatiles** | | | | | | |
| Acetone | | | | | X | X |
| 2-Butanone | | | | | | X |
| Ethylbenzene | | | | X | | |
| Methylene chloride | | | | | | X |
| Toluene | | | | | | X |
| Trichloroethane | | | | X | | |
| Xylenes (Total) | | | | X | | |
| **Semivolatiles** | | | | | | |
| Acenaphthene | | | | X | | |
| Anthracene | | | | X | | |
| Benzo(a)anthracene | | | | X | | |
| Benzo(a)pyrene | | | | X | | |
| Benzo(b)fluoranthene | | | | X | | |
| Benzo(g,h,i)perylene | | | | X | | |
| Benzo(k)fluoranthene | | | | X | | |
| Bis(2-ethylhexyl)phthalate | | | | X | | |
| Carbazole | | | | X | | |
| Chrysene | | | | X | | |
| Dibenz(a,h)anthracene | | | | X | | |
| Dibenzofuran | | | | X | | |
| Di-n-butylphthalate | | | X | X | | |
| 2,4-Dinitrophenol | | | | X | | |
| Fluoranthene | | | | X | | |
| Fluorene | | | | X | | |
| Indeno(1,2,3-cd)pryene | | | | X | | |
| Phenanthrene | | | | X | | |
| Pyrene | | | | X | | |

**TABLE 4 *(Continued)***

**ECOLOGICAL CONTAMINANTS OF CONCERN IN EACH MEDIA**
**SITE 65 - ENGINEER AREA DUMP**
**RECORD OF DECISION, CTO-0130**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

| Contaminant | Surface Water | | Sediment | Surface Soil | Fish | |
|---|---|---|---|---|---|---|
| | Aquatic Receptors | Terrestrial Receptors | | | Fillet | Whole Body |
| **Pesticides/PCBs** | | | | | | |
| Beta-BHC | | | X | | | |
| 4,4'-DDE | | | X | X | | X |
| 4,4'-DDD | | | X | X | X | X |
| 4,4'-DDT | | | | X | | |
| Endosulfan II | | | | X | | |
| Heptachlor epoxide | | | | X | | |
| Aroclor-1260 | | | | X | | |
| **Inorganics** | | | | | | |
| Aluminum | X | X | X | | X | X |
| Antimony | | | X | | | X |
| Arsenic | | | | | | X |
| Barium | X | X | | X | X | X |
| Beryllium | | | | | | X |
| Chromium | | X | | X | | |
| Cobalt | | | X | | | |
| Copper | X | X | X | | X | X |
| Iron | X | X | | X | | X |
| Lead | X | X | X | X | | X |
| Manganese | X | X | | X | X | X |
| Mercury | | | | | X | X |
| Nickel | | | | X | | |
| Selenium | | | | | X | X |
| Thallium | | | | X | X | X |
| Vanadium | X | X | X | X | | |
| Zinc | X | X | X | X | X | X |

**TABLE 5**

**GLOSSARY OF USEPA REMEDIAL ATERNATIVE EVALUATION CRITERIA MCB CAMP LEJEUNE, NORTH CAROLINA**

- **Overall Protection of Human Health and the Environment** – addresses whether or not an alternative provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment engineering or institutional controls.

- **Compliance with ARARs/TBCs -** addresses whether or not an alternative will meet the applicable or relevant and appropriate requirements (ARARs), criteria to-be-considered (TBCs), and other federal and state environmental statutes, and/or provide grounds for invoking a waiver.

- **Long-Term Effectiveness and Permanence -** refers to the magnitude of residual risk and the ability of an alternative to maintain reliable protection of human health and the environment over time once cleanup goals have been met.

- **Reduction of Toxicity, Mobility, or Volume Through Treatment -** refers to the anticipated performance of the treatment options that may be employed within an alternative.

- **Short-Term Effectiveness -** refers to the speed with which the alternative achieves protection, as well as the remedy's potential to create adverse impacts on human health and the environment that may occur during the construction and implementation period.

- **Implementability -** refers to the technical and administrative feasibility of an alternative, including the availability of materials and services required to implement the chosen solution.

- **Cost** – includes capital and operation and maintenance costs. For comparative purposes, present worth values are provided.

# FIGURES

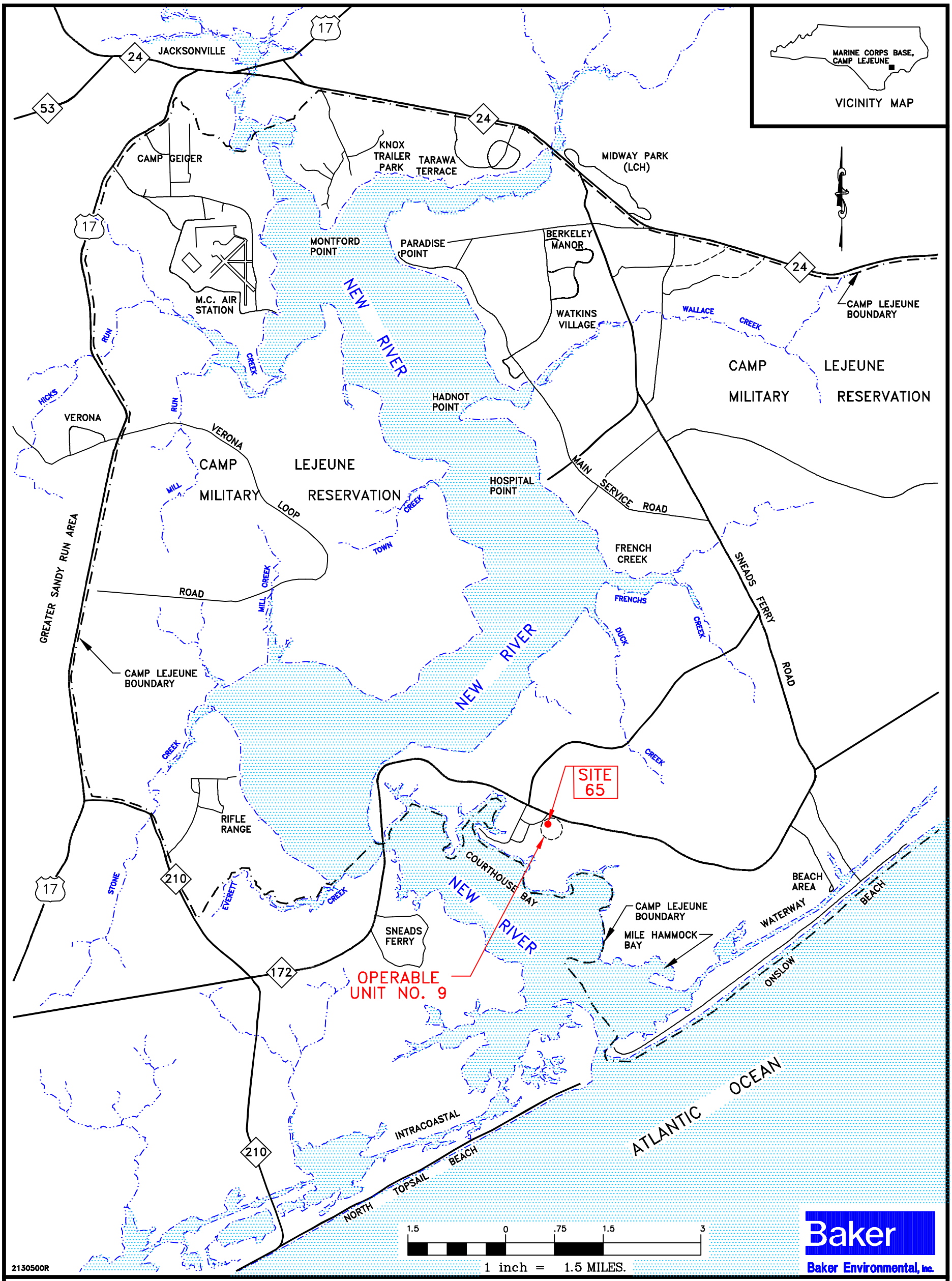
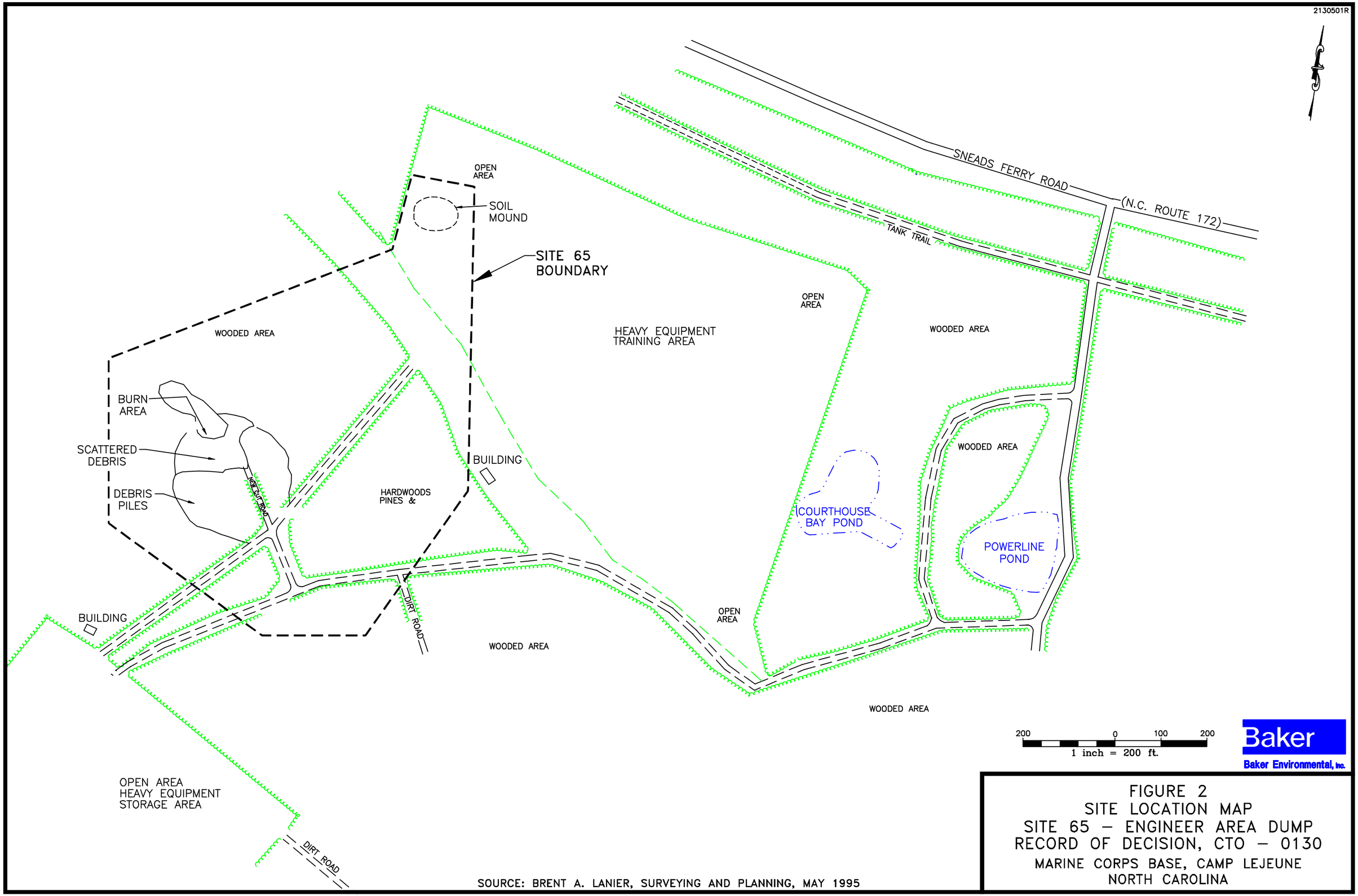



FIGURE 1
LOCATION MAP
OPERABLE UNIT NO. 9
RECORD OF DECISION
CTO-0130

MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

2130501R




Baker
Baker Environmental, Inc.

SOURCE: BRENT A. LANIER, SURVEYING AND PLANNING, MAY 1995

FIGURE 2
SITE LOCATION MAP
SITE 65 – ENGINEER AREA DUMP
RECORD OF DECISION, CTO – 0130
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

**FIGURE 3**

**CONCEPTUAL SITE MODEL**
**FOR CURRENT AND FUTURE HUMAN RECEPTORS**
**SITE 65 - ENGINEER AREA DUMP**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**

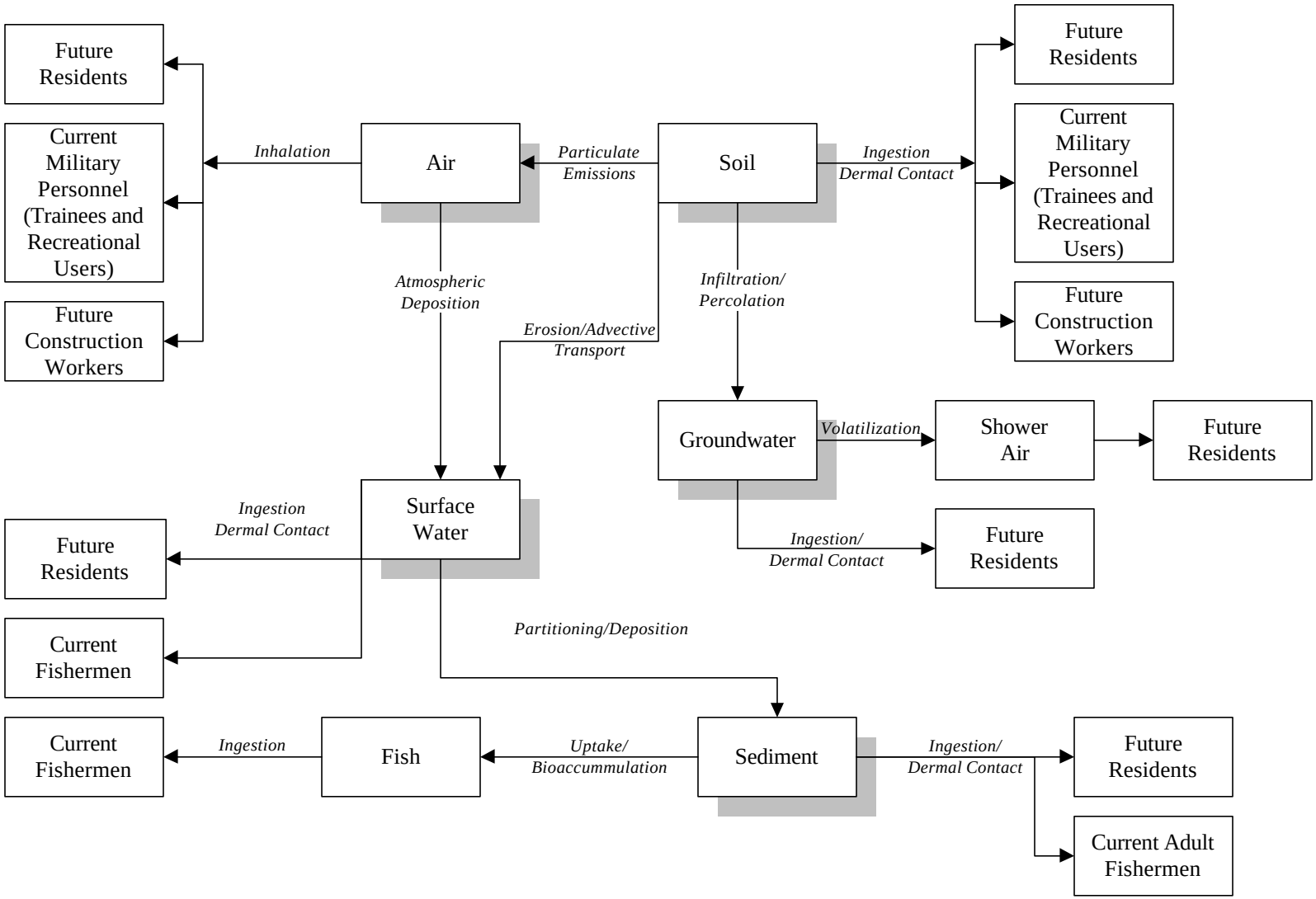
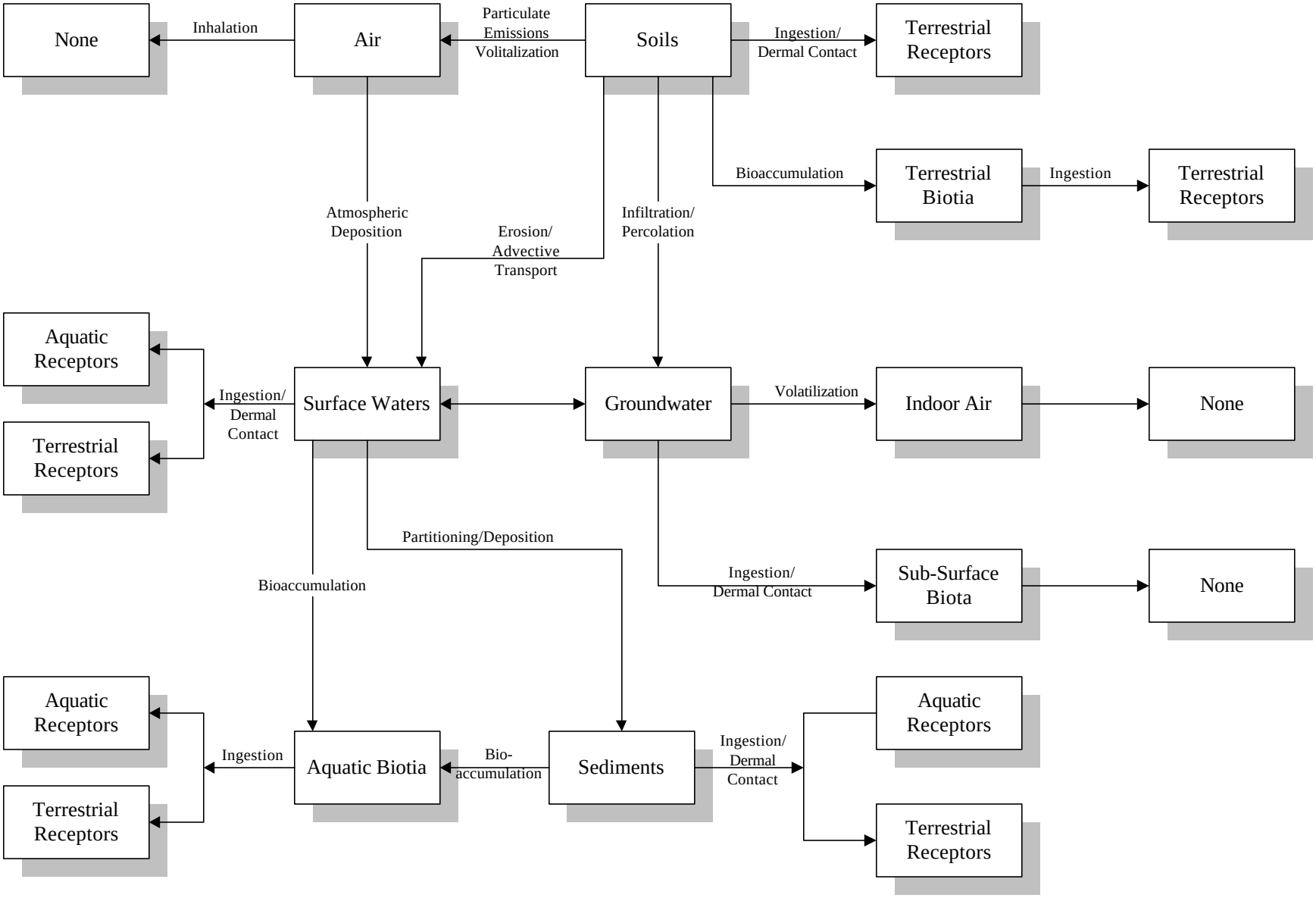


**FIGURE 4**

**CONCEPTUAL EXPOSURE MODEL FOR ECOLOGICAL RECEPTORS**
**SITE 65 - ENGINEER AREA DUMP**
**MCB, CAMP LEJEUNE, NORTH CAROLINA**



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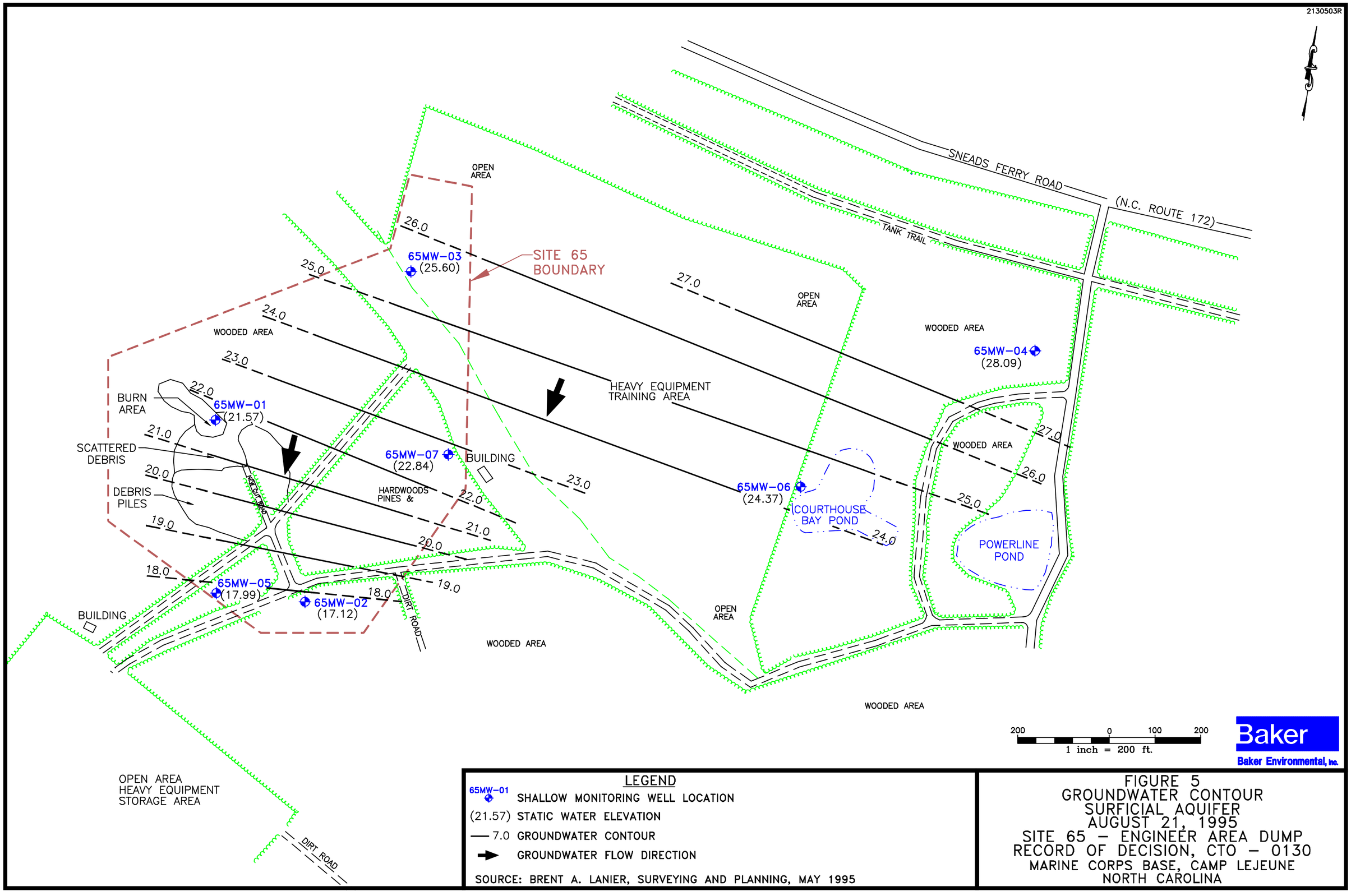



200 0 100 200
1 inch = 200 ft.

Baker
Baker Environmental, Inc.

OPEN AREA
HEAVY EQUIPMENT
STORAGE AREA

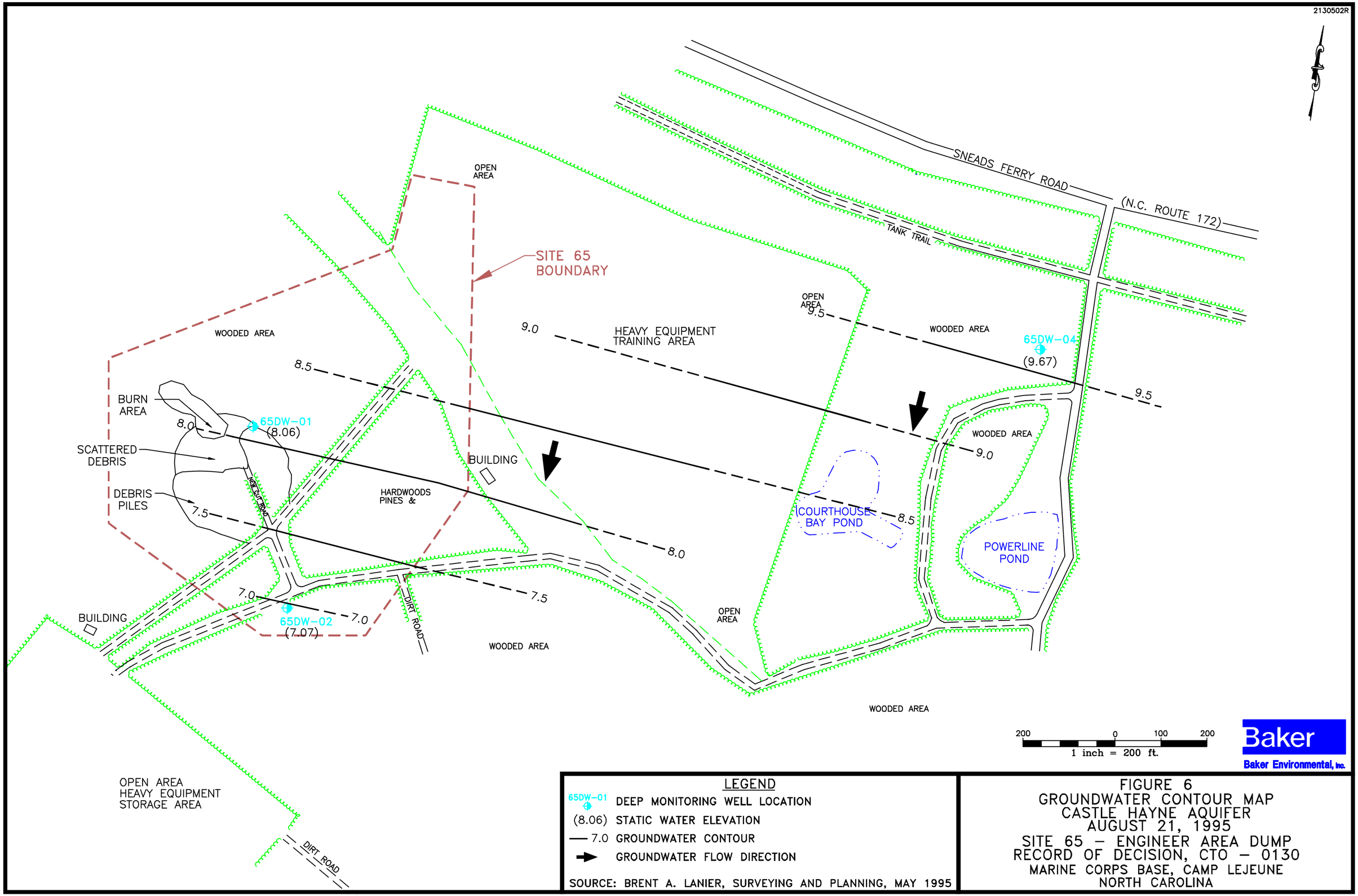
## LEGEND

65MW-01 — SHALLOW MONITORING WELL LOCATION
(21.57) — STATIC WATER ELEVATION
7.0 — GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION

SOURCE: BRENT A. LANIER, SURVEYING AND PLANNING, MAY 1995

# FIGURE 5
# GROUNDWATER CONTOUR SURFICIAL AQUIFER AUGUST 21, 1995
# SITE 65 – ENGINEER AREA DUMP
# RECORD OF DECISION, CTO – 0130
# MARINE CORPS BASE, CAMP LEJEUNE
# NORTH CAROLINA

2130502R

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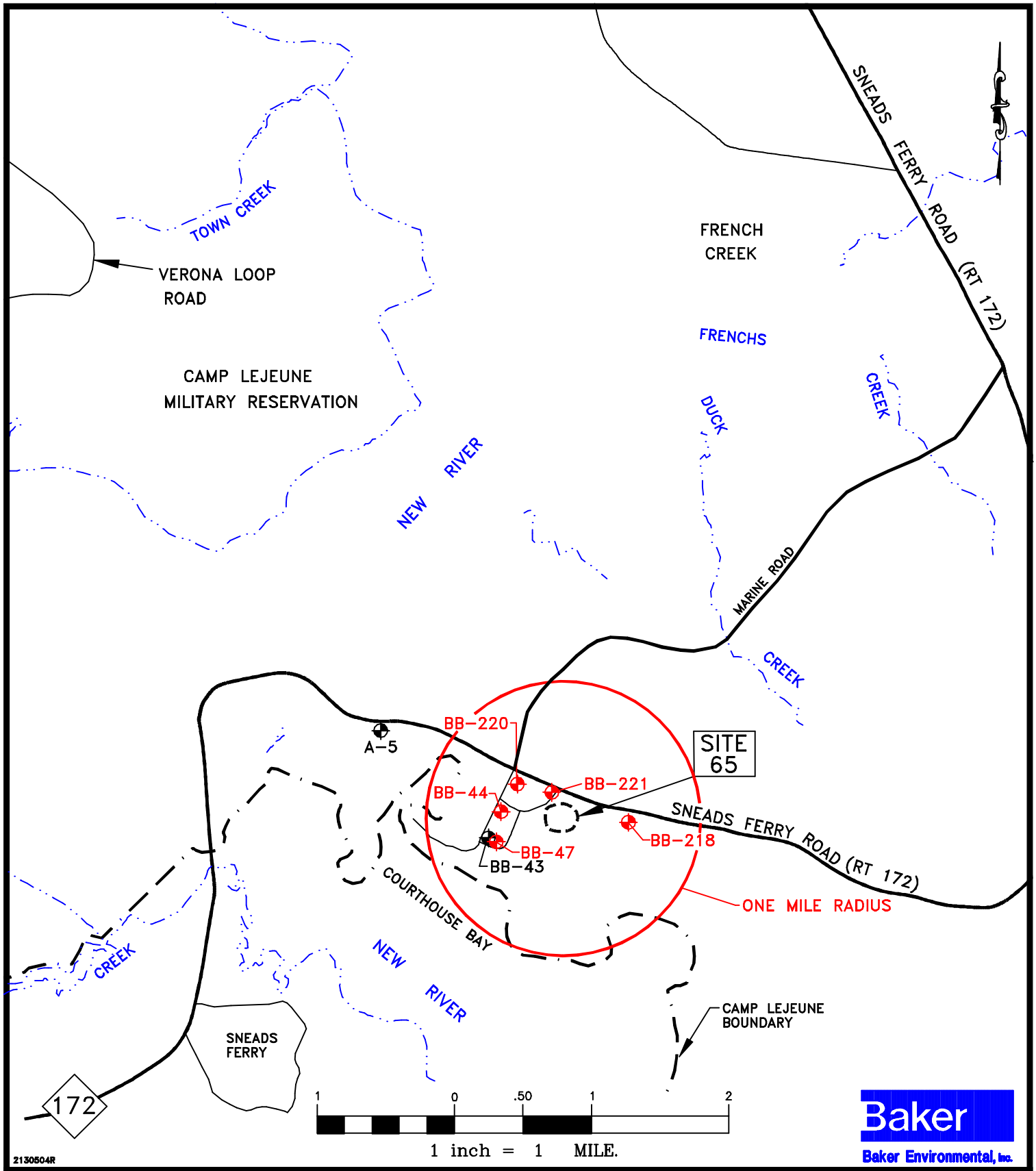
## LEGEND

- 65DW-01 — DEEP MONITORING WELL LOCATION
- (8.06) — STATIC WATER ELEVATION
- 7.0 — GROUNDWATER CONTOUR
- GROUNDWATER FLOW DIRECTION

SOURCE: BRENT A. LANIER, SURVEYING AND PLANNING, MAY 1995

# FIGURE 6
# GROUNDWATER CONTOUR MAP
# CASTLE HAYNE AQUIFER
# AUGUST 21, 1995
# SITE 65 – ENGINEER AREA DUMP
# RECORD OF DECISION, CTO – 0130
# MARINE CORPS BASE, CAMP LEJEUNE
# NORTH CAROLINA

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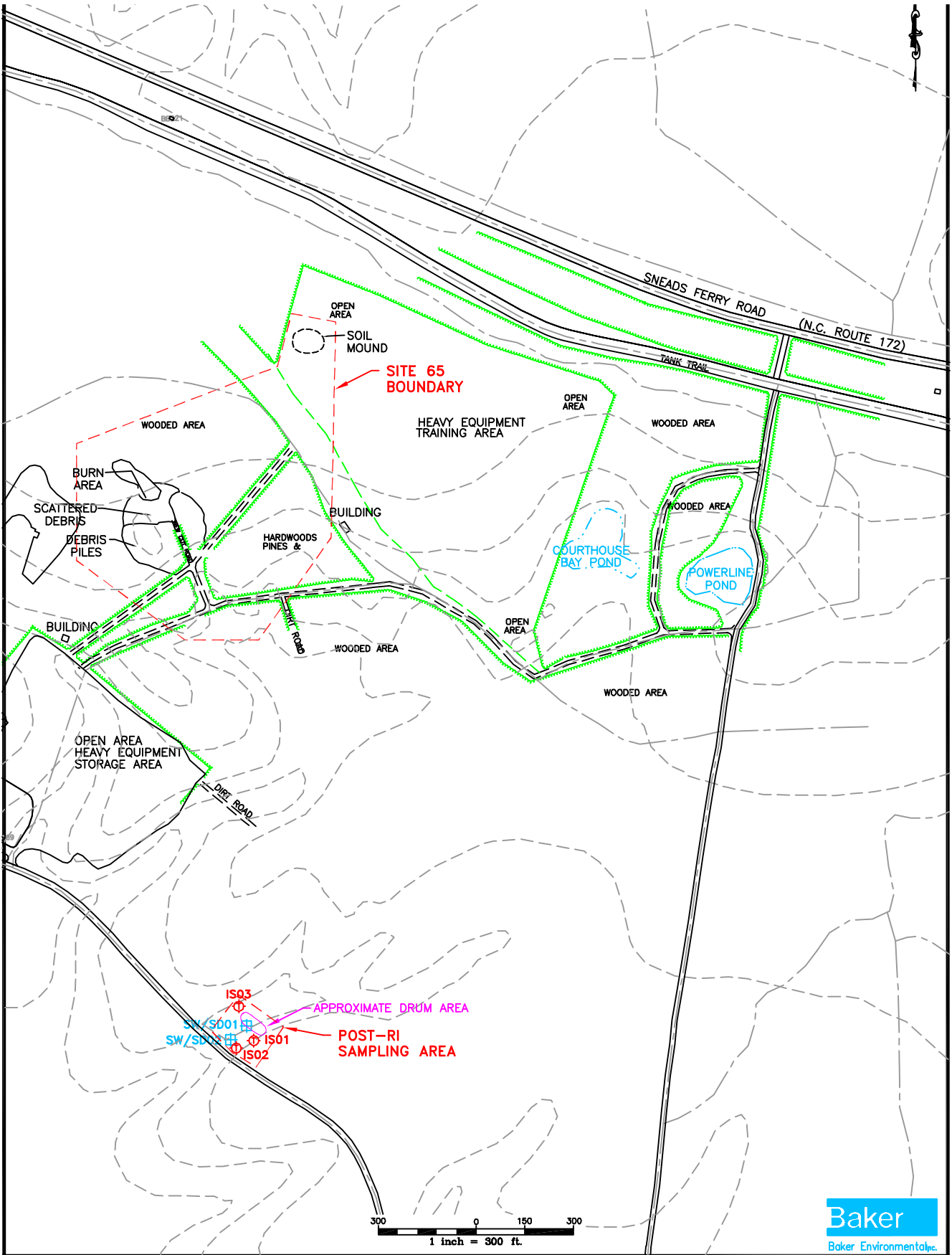
LEGEND

- SITE
- BB-221 – ACTIVE SUPPLY WELL
- BB-43 – DEACTIVATED SUPPLY WELL (1991)

SOURCE: GEOPHEX, 1993.

# FIGURE 7
## SUPPLY WELL LOCATION MAP
## SITE 65 – ENGINEER AREA DUMP
## RECORD OF DECISION
## CTO – 0130
MARINE CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA




LEGEND

- SEDIMENT SAMPLE LOCATION
- TEMPORARY MONITORING WELL LOCATION
- APPROXIMATE DRUM AREA

SOURCE: MCB, CAMP LEJEUNE, 2000.

FIGURE 8
POST-REMEDIAL INVESTIGATION
SAMPLE LOCATION MAP
SITE 65 - ENGINEER AREA DUMP
RECORD OF DECISION, CTO - 0130
MARINES CORPS BASE, CAMP LEJEUNE
NORTH CAROLINA

# APPENDIX A
# STATE OF NORTH CAROLINA CONCURRENCE LETTER

NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WASTE MANAGEMENT

MICHAEL F. EASLEY, GOVERNOR
WILLIAM G. ROSS, JR., SECRETARY
DEXTER R. MATTHEWS, INTERIM DIRECTOR

NCDENR

September 4, 2001

Commander, Atlantic Division
Naval Facilities Engineering Command
1510 Gilbert Street (Building N-26)
Norfolk, Virginia 23511-2699

Attention: Mr. Kirk Stevens
Navy Technical Representative

Commanding General
Marine Corps Base
PSC Box 20004
Camp Lejeune, NC 28542-0004

Attention: AC/S, EMD/IRD

RE: State Conditional Concurrence on the
Record of Decision (ROD)
Operable Unit No. 09 (OU09), Site 65
MCB Camp Lejeune, North Carolina

Dear Mr. Stevens:

The North Carolina Superfund Section has reviewed the Final ROD for OU09, Site 65 and concurs with the no action remedy subject to the following conditions:

1. Our concurrence on the ROD and of the selected remedy for the site is based solely on the information contained in the ROD. Should we receive additional information that significantly affects the conclusions or remedies contained in the ROD, we may modify or withdraw this concurrence with written notice to the Navy and MCB Camp Lejeune.

2. Our concurrence on the Interim ROD in no way binds the State to concur in future decisions nor commits the State to participate, financially or otherwise, in the cleanup of the Site. The State reserves the right to review, comment, and make independent assessments of all future work relating to this Site.

We appreciate the opportunity to review this ROD and look forward to continuing to work with MCB Camp Lejeune, the Navy, and EPA at Camp Lejeune.

Sincerely,

Grover Nicholson, Head
Federal Facilities Branch
Superfund Section

cc: Gena Townsend, US EPA Region IV
Neal Paul, MCB Camp Lejeune

1646 MAIL SERVICE CENTER, RALEIGH, NORTH CAROLINA 27699-1646
401 OBERLIN ROAD, SUITE 150, RALEIGH, NC 27605
PHONE: 919-733-4996 \ FAX: 919-715-3605

# APPENDIX B
# PUBLIC MEETING TRANSCRIPT

MARINE CORPS BASE (MCB)
CAMP LEJEUNE, NORTH CAROLINA

PUBLIC MEETING REGARDING

THE

PROPOSED REMEDIAL ACTION PLAN (PRAP)

---

FOR OPERABLE UNITS (OUs) NO. 9 (SITE 65)

AND NO. 17 (SITES 90, 91 AND 92)

---

July 18, 2001
Coastal Carolina Community College
Jacksonville, North Carolina

---

Reported by:

Kathryn F. Kilpatrick
Carolina Court Reporters, Inc.
105 Oakmont Professional Plaza
Greenville, North Carolina 27858
252-355-4700
800-849-8448
Fax: 252-355-4707

TABLE OF CONTENTS

MR. RAINES: I want to thank you all for coming out. Once again, we don't get a whole lot of public participation; kind of, either the public doesn't have a good deal of trust in the work we're doing on base or they're just not interested, but I want to welcome you here tonight. We're here to talk about the proposed remedial action plan for four sites. These four sites are grouped under two different Operable Units. One Operable Unit is OU 9, Site 65. It is an old five-acre dump. It is physically located out at Courthouse Bay back in the woods. This dump was used mainly for construction debris, but it also had some liquids disposed there and some batteries and things like that. The other Operable Unit is 17, and it includes Sites 90, 91, and 92. These three sites were old underground storage tanks that, upon removal, it was discovered that there was some solvent ground water contamination. We spent a couple of years investigating these sites and, as part of the CERCLA process, once we have completed our investigation, we are required to present our findings and our proposed plan to the public for their comments. We are proposing a no-further-action record of decision for these sites, based on the fact that there is very little contamination associated with these sites, and the fact that there is no human health or environmental risk associated with these sites. Tonight, we have with us representatives of the EPA, the State Department of Environment and Natural Resources, and Baker Environmental, our engineering consultant, on-base contractor. They will be giving a presentation tonight, explaining what we have done, what we have found, what we are proposing. If

you have any questions, go ahead and just stop them. If you would, state your name for the court reporter, and then at the end we will go ahead and have a question-and-answer session so that we can make sure that we address all your questions. Rich Bonelli is with Baker, and he will start this off.

MR. BONELLI: Before I begin, I want to introduce some of the Baker team who came down with me this evening. With me is Ellen Bjerklie Hanna, who will be presenting on OU 17; Karen Wood, who is our lead human health risk assessment specialist; and Heather Governor, who is our lead ecological risk assessor. Please feel free to ask questions, and I will be speaking this evening on OU 9. The purpose and objective of our meeting this evening is to provide the community with the overall understanding of the investigation, findings and results, to inform the community of the process used for the selected remedy, and lastly we want to make sure that the concerns of the community are met in terms of addressing the selective remedies we will be speaking to tonight. As far as the topics that I want to cover, I'll be talking a little bit about the site description and history. I'll then get into an overview of the investigations and their findings and a summary of the site risks. I'll then move into the scope and role of the proposed response actions. Lastly, again, questions and answers. But feel free to ask questions as I'm going along.

Site 65, OU 9, is located in the southern part of Camp Lejeune, near Courthouse Bay. Originally, Site 73 was also included within OU 9 but was removed because of additional studies

that will be going on there, so right now, Site OU9 only includes Site 65.

Site description: As Rick said, the site is very heavily wooded. Really, the only open space is located just east of the site where the Engineering School resides. There are two small ponds located just east of Site 65 we also looked at during our investigation.

Site History: This site operated -- operations occurred there from 1952 to 1972, of which, reportedly, there were two separate disposal areas, one related to battery acids, the second one related to POL wastes (or petroleum, oil and lubricants). In addition to those areas, through investigations of aerial photography, we also noted a burn area on the site as well as these large debris mounds, or piles, which were predominantly there from the operations of the school. They do a lot of training with bulldozers. As I show you some of the pictures, you'll see some of these mounded areas. Here's a site plan of the area. The investigation boundary, study area, was up in this area here. You'll notice the debris piles here, the burn area, which we discovered through review of the aerial photography. To the east, the heavy equipment training area, and further east we have the two ponds which I spoke of earlier. This is a panoramic shot we took during the RI. Again, it's a very heavily wooded site. You'll notice in the background these mounded areas, again created from the bulldozing operations from the school. This picture identifies

some of the pails, corroded cans, we found as part of the debris. None of the cans that we found, none of the discarded debris contained any waste or liquids in them. They're very old and corroded. This is a shot of Courthouse Bay Pond. Again, notice the very heavily wooded area. The color of the pond water is very turbid, and that was created from water in the runoff. There is a lot of runoff through soils that ended up in the pond here.

Overview of the Investigation and the Findings: For the most part, there have been three studies conducted at the site, the first one being the Site Inspection by Baker back in 1991, the Remedial Investigation conducted by Baker in 1995, report coming out in 1997, and post-RI sampling, which was conducted just recently, April of this year. The Site Inspection study (the SI) -- and SI is one of the very early studies done in the CERCLA process. Predominantly, the SI is done to give us some initial understanding of the volume of waste that may be there, estimated areas of contamination, and things like that. It was a very small-scaled operation we were studying, but we looked at some of the focused areas. The investigation itself -- we looked at soil, we looked at ground water, installing some shallow ground water monitoring wells, and we collected surface water and sediment samples from the two ponds that I spoke of earlier.

The Results of the SI and the Recommendations: In the soil and ground water, surface water and sediment, we did find some low

levels of organic compounds, as well as some inorganics, being metals. Probably the most important, I guess, detection, if you will, from the study are some of the compounds we found in the soil. The recommendation of the SI recommended the site then move into what's called the RI process (or Remedial Investigation), which is the next step in the CERCLA process. The RI, again, was conducted back in 1995. The Remedial Investigation was a continuation of the SI, and was expanded to include not just the immediate area Site 65. We also included some areas to the east in the Engineering School area. Again, we also looked at the ponds. The purpose of the RI was to better define the levels of compounds that we detected, but also to perform a human health and ecological risk assessment based on the data. The field program itself -- again, we looked at a number of different media from the soil and the ground water. We installed some additional monitoring wells. We sampled the surface water and sediment from the ponds. We also did some exploratory test pits, in which we had a backhoe on site, and we did some digging around to see if we could find any buried materials or wastes. And lastly, biological sampling of the ponds, which included both the fish and benthic organisms. Here is a site map showing the locations during the Remedial Investigation. Again, most of our sampling activities were focused in this area here in the debris piles, in the burn areas, and we expanded the investigation to also look at some areas to the east. And lastly, again, we took some samples from the two ponds.

RI Results: I'm not going to go through each and every one of these in great detail. In general, we did find organic compounds and inorganics in all the various media. Predominantly, a lot of the organic compounds -- and when I say organic compounds, I'm referring to the volatiles and semivolatiles, PCBs and pesticides. There were a number of these compounds that were either laboratory contaminants or associated with plasticizers which show up in some of the sampling equipment. Some of the PAHs, which are a subset of the semivolatiles, did show up in the area of the burn operation, which we expect. Anytime you burn materials, you have a residue that is left behind. You're going to find some PAHs. In terms of the fish data, as you see here, we did find some both organic and inorganic compounds and metals. As far as the first number you see that is kind of large, the problem was a compound called acetone, which is associated with a laboratory contaminant. By and large, the inorganics that we found to be in the metals were probably ubiquitous or naturally occurring in the environment if you find a lot of metals, such as iron and manganese that are very common, both in the ground water as well as the soil. Lastly, in April of this year, we conducted some post-RI sampling. Early -- I believe it was January of this year -- near Site 65, they found some containers not -- you'll see the map next -- not necessarily at Site 65 but in the general area. It was felt at that time that sampling needed to be conducted just to confirm or deny whether the contaminants or anything had leaked from these containers. As far as where that area was, again, here is the main Site 65 area we

looked at during the RI. The area where we found the containers is down in this area here. It is some distance away from the investigative area.

Post-RI Investigation: We looked at the soil, ground water, surface water, and sediment in the immediate area of those containers. We took some soils. Ground water was collected from some hydropunches to get an idea of the ground water. And there was a creek that ran very close to the containers themselves, and we sampled surface water and sediment as well. The results showed that the area around those areas was not impacted from a leak or disposal of those containers, which was good. So we didn't really identify anything that could have come from those containers.

Summary of the Risks: I may have mentioned earlier about the Remedial Investigation. As part of that process, we will conduct a human health risk assessment and ecological risk assessment. The human health risk assessment will look at current situations as well as future situations for the contaminants of potential concern. We also look at a number of potential receptors nearby, and those receptors could be military personnel, children, construction workers. The information from the sampling data itself, we take that information, combine it with the different scenarios, and we try to come up with a risk, or develop a risk assessment number through various calculations. I followed the EPA guidelines. Our risk assessment showed that the site was found to

be within the acceptable range of the USEPA guidelines. I mentioned earlier about some of the inorganics found in the fish. We did find a slight exceedance from the mercury for young children through the consumption of fish. It is interesting to note that the other media on the site -- we looked at the ground water, surface water, and so forth -- did not have mercury. So, we concluded that the fish were brought in from somewhere else and basically put in the pond as part of a stocking, I guess, if you will, of the ponds. So, we believe that the fish themselves did not come from the site. Thus, we would make the conclusion that the inorganics found in the fish did not come from activities at the site. Ecologically, we also conducted a risk assessment there to look at the endpoints for both aquatic organisms living in the pond as well as terrestrial organisms -- rabbits, things like that, that may live in the area. The only thing we found there was a potential risk -- ecological from the pond itself, predominantly from the suspended material we noted in the surface water. If you think of the picture I showed you earlier, it was very turbid. In the area at the site at the pond, you've seen a lot of runoff from the area; it was very turbid. So, we believe that the ecological risk there was created from the suspended material in the water itself. The conclusions that we reached from the risk assessments were that there were no releases of the substances on the site that generated an unacceptable risk both to human health and the environment; again, a very sophisticated process of going through a lot of numbers and a lot of calculations to reach those

conclusions. The proposed action at the site is no action at all, which means that the site will be left as is, current conditions. Again, this recommendation, these conclusions were reached through a number of sampling rounds we conducted in the SI, in the RI, and the post-RI, and through our evaluation of site risks. This will be concluded through a no-action ROD, which will be coming out sometime in September, but that's going to be our proposed remedy for this site. That concludes my presentation. If there are any questions that I can answer or our Baker team here.

MR. SWARTZENBERG: I want to ask you about the fish. You said there was a slight risk for children if they ate the fish?

MR. BONELLI: Yes. That's based on a -- Heather, you could probably speak to this better than I can, or Karen, can you maybe address that? That is Karen Wood from Baker.

MS. WOOD: Can you state your question again?

MR. SWARTZENBERG: I was concerned about the fish. First of all, how can you be so certain that it came with the fish you say were stocked there? Did anybody check with fish wildlife to see if there were any stocking programs there?

MS. WOOD: I believe at the time we did, and then this data was also reviewed by a toxicologist from the State of North Carolina, so there were some indepth further studies that addressed that issue at the time. And it was concluded that the fish were stocked, and the toxicologist felt those concentrations really would not pose a human health risk. The equations we use to calculate risk to humans in that particular scenario are very

conservative. That's assuming a child would eat a meal of something -- I don't remember the exact numbers -- but it's several grams of fish tissue on a daily basis. We try to look at the most conservative exposure assumptions.

MR. RAINES: Even fish from that pond?

MS. WOOD: Yes.

MS. TOWNSEND: I would like to add -- I'm Gena Townsend with EPA. When we saw that data in '97, before we even conducted the risk assessment, we were a little concerned ourselves. We sent that data to the state toxicologist in the Department of Public Health division, and -- I'm not sure what division -- and let them look at the data. We also did, I guess, a little more detail in the different type of fish, and the tissue samples were versus a whole fish, versus the edible part of the fish. And the recommendation from the State was that it's okay. So, we did have that concern before we even completed our investigations. And that all was addressed back in '97 and '98, so we're pretty confident that we're pretty clear on that.

MR. SWARTZENBERG: So, there is no mercury in the water, is that what you're saying?

MS. TOWNSEND : Right.

MR. SWARTZENBERG: It's just in the fish.

MS. TOWNSEND: Right. The mercury that we detected we only detected it in the fish. We did not detect it at the site in the soils or the water at all.

MR. SWARTZENBERG: Okay. So if I wanted to go fishing

there, I could go fishing there tomorrow, right? It's not off limits or anything.

MR. RAINES: You'd just have to check with the game warden on base, but I would imagine you probably could.

MR. SWARTZENBERG: Okay.

MR. HUMPHRIES: How do you determine where to get your core or your soil and water samples? Let me paint you a scenario. That's a training area also, which means that over the years, engineers, contracts, they've used it for training and what have you. Anytime you're out in the field, four or five, sometimes a couple of weeks, the drivers and operators of these various pieces of equipment, they do first- and, sometimes, second-eschelon maintenance. From '52 to '72, they had no rules. You dumped oil right where it fell. You could top off with a tank or something, you'd have spillage, it goes right into the soil then. That's all over the place. My question is how do you determine where you get your soil samples?

MR. BONELLI: One thing we did, Mr. Humphries, was to go back and look through historical aerial photographs, dating back to all those years. One of the issues, obviously, is when we get out there it is so heavily wooded, where do you go? We were able to find historical photographs that showed us areas that were cleared, like the burn area that I spoke of earlier. So, we tried to use aerial photography to position our samples. Obviously, going to the outside, we sampled an area where we thought that could be impacted. So that sampling event, we kind of expanded outward

using, again, historical photographs. There may have been some interviews conducted with some people to find out operations, but they weren't just put on a map. There was some thought process behind them as far as where to go.

MR. HUMPHRIES: It's a lot of guesswork though.

MR. BONELLI: Well, it's a very large area, and the aerial photographs were extremely helpful because they did show, again, some areas that were cleared that looked like they could have been potential disposal operations, and so that was sort of the basis of where we sampled.

MR. HUMPHRIES: How big is the area, do you know? How many acres?

MR. BONELLI: I think the dump area itself that I showed you is five acres in size. And, obviously, that's just the dump area. We investigated a lot larger area than that. When it goes out to the Engineering School area and the pond, that's well above and beyond the five acres. Anybody else that has some questions? Thank you very much. I just need a minute to change the slides over. Ellen will be speaking about OU 17.

MS. HANNA: As Rich said, my name is Ellen Bjerklie Hanna with Baker, and I'm presenting today on Operable Unit No. 17, which includes three sites, Sites 90, 91 and 92. It's the same format as Rich went over. We need to present this information to the public so that we can get feedback from you on what our recommended response is. I'll be giving you a brief history, talking about the studies that were done and a summary of the site risks. You can

feel free to ask questions as I'm going along, but also at the end. This is Operable Unit 17 here. It's close to where OU 9 was that Rich spoke about. These three sites are right off of Courthouse Bay, and they were grouped together because all three of them were former UST sites (underground storage tanks). There were several programs done at these sites. As I said, they were underground storage tank sites. There were three well site checks done at each of these sites, and this is in the UST program. They installed three monitoring wells and took samples of soil and ground water, and based on the results of that, they may or may not have gone on to what's called the Leaking Underground Storage Comprehensive Site Assessment. Then, depending on the results of that, you will see later, they ended up in the Installation Restoration Program, where we did a Remedial Investigation and then followed up with Post-RI Investigations. Site 90, the first site, had three 1,000 gallon tanks. There also happened to be at this site an above-ground storage tank (AST), and it's basically used for industrial/commercial land use. There was a dry cleaning facility at this site. And here are some photographs. This is after the tank removal. Here's one of our monitoring wells that was installed during the three well site check. That's looking at the site from a different angle. As you can see, it's open, grassy areas among some buildings. And here is a drawing of the site. The tank was located approximately between these two buildings. During the three well site check, which was conducted in 1993, as I said, three monitoring wells were installed. They sampled

subsurface soil and found several contaminants associated with underground storage tanks, and BTEX, which is benzene, toluene, ethylbenzene, and xylene in the ground water. Based on that, because they found those contaminants in the subsurface soil and ground water, they put that site into -- they did a study called the Leaking Underground Storage Tank Site Assessment, and they found two areas of ground water contamination, the northern area and the southern area, which -- the northern area was around up here. There was a small plume down here. And we found several contaminants in the ground water, relatively low levels. In the subsurface soil, we also found BTEX petroleum which you might find this at an underground storage tank site. They also found total chlorinated hydrocarbons and, because of those chlorinated contaminants, it was put into the Installation Restoration Program, and we did a Focused Remedial Investigation. They sampled for subsurface soil and ground water, and we took several samples. We detected these contaminants in the subsurface soil and several contaminants in the ground water, including PCE. These are the sampling locations for the RI. We installed more wells, in addition to the wells that were already there from that underground storage tank study. Those were subsurface soils and the samples and locations, and these were the ground water sample locations. They were basically the same locations, because as they installed the monitoring levels, they also took soil samples. Based on the analytical results that came back during the post-RI, we did a qualitative risk assessment, and for the qualitative risk

assessment, we took those results and screened them against various levels that were established by the EPA and North Carolina -- for both the soils and the groundwater, including these listed here. Risk Based Concentrations and the North Carolina Soil Screening Levels, we also looked -- compared the concentrations against QA/AC blanks and naturally occurring levels. At Site 90, no COPCs were identified in the subsurface soil. A COPC is a contaminant of potential concern. If one of the concentrations exceeded any of these screening levels, it was listed as a contaminant of potential concern. Nothing was identified from the subsurface soil. However, in the ground water there were a few identified -- some inorganics and PCE and chloroform. The inorganics were at levels that were considered naturally occurring. Inorganics occur in the site -- they are in the earth's crust everywhere, and they were within these levels of what we consider common around the Camp Lejeune area. So, there was nothing out of the ordinary, and there was no reason to suspect why there would be any kind of metals contamination at this site. Chloroform, we believe, was related to laboratory contamination or our decontamination procedures. It's a common contaminant that comes up. Therefore, only the PCE, which is tetrachloroethene, was considered to be site related. Because of the PCE detection, which was in one monitoring well at the site, we decided to do a supplemental ground water investigation, which was conducted in 1999 just to confirm the PCE concentration and, also, to make sure that those contaminants we believed were laboratory or decontamination related were such. Several

contaminants were found. Most of them, actually all of them, were believed to be not site related because we confirmed that they were laboratory or decontamination procedures. We did not detect tetrachloroethene, but we detected TCE (trichloroethene), and it did exceed the risk based concentration. That was out of the same well that PCE was detected in before, and that was the only well that it was detected in.

MR. SWARTZENBERG: Was that the well that was the closest to the above-ground storage tank?

MS. HANNA: It was near a concrete pad, actually, which was closer to the AST location. The AST contained, at one point, dry cleaning fluids, and that had been discontinued. Rich, do you know what year maybe that was discontinued?

MR. BONELLI: It's been a while.

MS. HANNA: Yeah, it was a long time ago. It used to be a dry cleaning operation, but was stopped, and then it became only a distribution center. Because of that, we did a Temporary Well Delineation Study -- because of the TCE. There were no wells immediately near that particular well, and we wanted to determine whether it was part of a larger problem, or if it was just in that one little area. So, three wells were installed. One upgradient and two downgradient of that well. No TCE was detected in any of these wells, so we concluded that it was a small area, it was not a larger problem. The temporary wells were located here, here, and here. MW04 is right there.

MR. RAINES: Where was the well site with -- or the

concrete pad with the AST?

MS. HANNA: The AST, I think, was located, around here.

MR. RAINES: Okay.

MR. SWARTZENBERG: So, it was probably related to the storage tank that had dry cleaning fluid in it.

MR. HUMPHRIES: Question. Did any of these contaminants get in the aquifer?

MS. HANNA: These were all in the shallow aquifer. All these wells were -- there were a couple of intermediate wells, but the only contaminant -- Oh, MW04, where that contaminant was found, is a shallow well, which is -- I'd have to look up the depth, but it was not in the drinking water aquifer. The Castle Hayne is -- Rich, could you answer how deep the Castle Hayne aquifer is?

MR. BONELLI: In this area of the base, it's probably down around 60 to 70 feet down.

MS. HANNA: Yeah. This well is less than 30 feet for sure, and the contamination was not within the Castle Hayne aquifer.

MR. HUMPHRIES: My second question. You mentioned a large plume and a small plume. An acre, half-acre, or what?

MS. HANNA: That was in the original study. I don't have an acreage. I don't know.

MR. BONELLI: That was done during the UST study years ago. They just identified them, I think, as a north and south plume. I don't think they actually got into the acreage, if I remember right.

MS. HANNA: They didn't give acreage. Conclusions for this site -- we are recommending no action because the PCE was no longer detected, and TCE was in a very small area. The other contaminants that were identified as COPCs were not site related. A ROD will be prepared based on this no action that will be taking into account public comments and CERCLA process will be concluded for this site. I guess this site may go back into the UST Program, but I'm not sure. Rick, could you comment on that? Do you know if these sites are going back into the UST Program?

MR. RAINES: I see we're going to determine that tomorrow, but they will be all relevant and applicable requirements -- regulations that the USTs are subject to. So, we meet all the requirements that the UST Program sets out to meet, too. Did that answer the question?

MS. HANNA: It did for me.

MR. SWARTZENBERG: What about the TCE that's still in the ground water there? You're just going to forget about it, right?

MR. RAINES: We've shown that it's deteriorating, haven't we?

MS. HANNA: Yes.

MR. RAINES: It's naturally deteriorating. It's going from PCE to TCE, and it's in one well. We're showing that it's breaking down, and we have every reason to believe that it will continue to break down until it goes away.

MS. TOWNSEND: I think, to add to that, it has taken us about four years to really close out the site. And because it was

only a minor problem for the IR Program, being that the TCE was just a little incidental hit as compared to the UST site, we're thinking that this is one case where the UST contamination helped our natural attenuation process; what we're trying to improve in other parts of the base, and that we've seen the degradation and plus, I don't have the exact concentration, but the TCE that is remaining out there are very low levels. We're talking -- what was it, 17?

MS. HANNA: It's lower than that.

MR. RAINES: It's 2.

MS. TOWNSEND: It's 2? It started out 17, and now it's 2, and it's less than the standards for remediation. So this is one program where a contaminant may have helped another contaminant, and it's remediated itself.

MR. SWARTZENBERG: Okay, I just didn't pick that up.

MS. HANNA: The next site is Site 91, also UST sites. And this one had one 300-gallon tank. There also happened to be four ASTs removed that contained waste oil, antifreeze, and kerosene, and it's basically an industrial land use setting. Here are some photographs. You can see a concrete cover, only tiny grass patch areas here amongst buildings. There is an open area there, but it's used for -- is this the Engineering School area? Site 91?

MR. BONELLI: I believe so.

MS. HANNA: But it's pretty much industrial use. And here is a drawing of the site and the former ASTs were here. The

former UST basin was approximately here. As with Site 90, a three well site check was done which found oil and grease in the soil, and toluene in the ground water. Because there were contaminants detected, they did a leaking underground storage tank assessment, and again found two areas of contamination, which included the chlorinated hydrocarbons again. So, that kicked it into the IR Program. They also found chlorinated hydrocarbons in the subsurface soil, so it went into the IR Program. And we did a focused RI, did subsurface soil sampling and ground water sampling. Again, we found common laboratory contaminants and inorganics in the subsurface soil at -- the inorganics at levels similar to naturally occurring levels. In the ground water, there were more laboratory contaminant type things that we did not consider site related. These are the subsurface soil sample locations during the RI, and the groundwater sample locations. And a qualitative risk assessment was done at this site, based on the post-RI results, using the same screening criteria as for Site 90. For subsurface soil, one inorganic was identified as a COPC.

MR. SWARTZENBERG: What is a COPC?

MS. HANNA: Contaminant of potential concern. Because it exceeded the screening criteria that is established by EPA or the State. In ground water, these contaminants were identified as COPCs, and many of them weren't considered site related at all. In fact, none of these.

MR. SWARTZENBERG: Well, if they're not site related, what are they?

MS. HANNA: Well, the inorganics are naturally occurring. Chloroform here is considered a common laboratory contaminant. And when we looked at the concentrations -- the detections at the site, they were within -- there is a USEPA rule of thumb. When your concentration is less than 10 times your blank sample -- because we collect quality control samples -- if it's less than 10 times the concentration found in that sample, then you can't count it as being site related.

MR. SWARTZENBERG: Well, how could it be a contaminant of concern if it's not site related? It sounds like double talk.

MS. HANNA: The contaminant of potential concern -- what happened during the qualitative risk assessment was you take all the data and we screened it against the screening criteria which were not site specific; they are criteria that are established by EPA or the State, depending -- well, they both establish criteria. It may exceed one or the other. You often have different numbers. We took all the results, screened them, and then after that, we took a look at the QAQC -- some samples, and the naturally occurring levels of inorganics, and also looked at our concentration and compared it against those after the COPCs were identified. That was the second step. So, we took the entire list of contaminants, identified COPCs, and took only the COPCs that were identified, and then looked at those concentrations and compared it against the QAQC or naturally occurring levels. So, it was like a two-step process.

MR. RAINES: If I can add something to that. Jim,

remember when we went to -- we did the field trip and we did the sampling tests out at the well?

MR. SWARTZENBERG: Yes.

MR. RAINES: And they showed you how they brought out their own water and how in between sampling events they had to decontaminate the equipment and all that kind of stuff? They take a trip blank, use a sample of the water they take out to the site. They just return with that water, plus they -- but, during these processes, these contaminants can enter into -- say, they rinse off their probe and they don't get all the chloroform off. That's going to show up in the next sampling round. So, some of these things are introduced through --

MR. SWARTZENBERG: I guess it's just the way you're presenting it. You call it a contaminant of concern; what's the "p" for?

MS. HANNA: Potential.

MR. SWARTZENBERG: Then you say, well, it's not a big deal, because it's chlorinated. How can it be both?

MR. RAINES: Anything that pings high is a potential contaminant. And then we try and find out how they -- is it site related, or was it introduced during sampling?

MR. SWARTZENBERT: Okay.

MS. TOWNSEND: One thing that you keep in mind, the process is designed so you do not eliminate contamination before you evaluate it. Because that way, you can come up with a lot of false positives or false negatives. So what you do is you identify

whatever you found, then you start looking for the resulting action that caused that contaminant to be there. And in some of are cases, you could have chloroform that is an actual contaminant of the site. But you want to measure it against your blank in your equipment process before you do delete it from the list.

MR. SWARTZENBERG: Okay.

MS. HANNA: In order to verify just what you're talking about, whether things were site related or not, we did do a supplemental ground water investigation. They sampled 11 monitoring wells, and these contaminants came out. All three of these are considered common laboratory contaminants. We did the same process. We screened it against our blank samples and determined that they weren't site related. We did find some chloroform that were above the 10 times blanks. So, we have to classify that as site related. And, we also found two detections of Bis(2-ethylhexyl)phthalate, which is a common laboratory contaminant, but they were above the 10 times rule, so we classified them as site related. These contaminants were also detected. Because of that, we put it into our Post-RI Monitoring Program. We put it into our sampling program just to check on that. And they sampled eight wells. We did it quarterly, so we have four rounds of data for this site. Chloroform was detected in two individual wells, one in July of 2000 and one in October of 2000, but was not detected since then. So, there were two quarters where it wasn't detected at all anywhere on the site. Arsenic and iron were detected, but within these naturally occurring levels,

and pyrene was detected -- there was one well in October at low levels and it was never detected again. So, because of the follow-up studies and analysis, we believe that -- well, we recommend no action, because we don't believe them to be site contaminants or site related. So, we've recommended no action. CERCLA process will be completed at the signing of the ROD, when we take into account public participation and comments, and the same thing for this site with the UST Program, as Site 91. Any questions on Site 91? Any other questions?

We'll move on to Site 92. There was one 1000-gallon tank removed in 1994. During the removal, they found elevated levels of petroleum hydrocarbons and here is a photograph. There is a pier; boats are there. It's somewhat of a recreational area; there is a picnic area. Here is the site. This is the Courthouse Bay here. Here is the pier, and there is the approximate location of the former UST. Because it was a UST, they did the three well site check. There was nothing found in the soil, but they found PCE in ground water and because of that it went into the IR Program, and they did a Focused Remedial Investigation on it. They studied subsurface soil and ground water and found inorganics, acetone, which is considered a common laboratory contaminant, and the same with the bis(2(ethylhexyl)phthalate and also, I believe, one detection of that pesticide in subsurface soil. Chloroform and inorganics were found in ground water. Here are the subsurface soil locations from the RI and ground water locations. The Qualitative Risk Assessment was done at this site as well. These

contaminants were found to be -- when screened were identified as contaminants of potential concern. Inorganics were within background. The acetone and chloroform, we believe, because they were below the 10 times rule, were considered laboratory or decontamination procedures. Because we found these lab contaminants, we wanted to verify that and also the inorganic levels, so we did some post-RI monitoring. No VOCs or SVOCs were ever detected during the course of sampling. There were four rounds of sampling at this site. We did them on a quarterly basis. The inorganics were found but, again, these we considered to be -- they were within naturally occurring levels and we don't believe they were site related. So, based on these results, all these studies, over a course of time, we recommend no action. That would conclude the CERCLA process when the ROD is signed, and again, they may go back into the UST Program to address that -- close it out under that program.

MR. SWARTZENBERG: That tank was just gasoline.

MS. HANNA: Yes, it was just gasoline.

MR. SWARTZENBERG: Would any of that gasoline have MTBE in it?

MS. HANNA: None was detected.

MR. SWARTZENBERG : They did check for it.

MS. HANNA: Rich, do you know if they sampled for that?

MR. BONELLI: It's typically a requirement to look for that, but I don't know if their methods covered that. Sometimes they do, sometimes they don't.

MR. SWARTZENBERG: Do you know whether this tank was leaking?

MR. BURTON: I don't think the UST investigation found significant petroleum contamination. There wasn't any in the soils, the manganese, with respect to the ground water.

MR. RAINES: There were very little POLs. It was the chlorinateds that drove it to further investigation. It wasn't the POLs. Did not appear to be a release.

MR. SWARTZENBERG: I'd just be curious to know if they even bothered checking for MTBE. It wasn't a big deal until about a year ago.

MR. RAINES: Well, this is fairly old, too. This might have been before they even started adding MTBE.

MR. SWARTZENBERG: Well, that's my comment. You can do what you want with it.

MS. HANNA: I guess that's it. Any other questions on these three sites?

MR. BONELLI: I'd like to thank everybody for coming this evening for our presentations. If you have any questions, feel free to contact me, and we'll turn things back over to Rick and have him close our presentation for this evening.

MR. RAINES: Once again, we do have copies of the PRAPs up here. Be sure that everybody gets a copy of these. For your comments, I guess we will handle them informally. Mr. Swartzenberg, we'll get back to you with an answer on the MTBE. Want to make sure you signed in, so we'll have your name, and if

there are no more questions -- does anyone have any more questions?

MR. HUMPHRIES: I have one. How is the money situation for the cleanup?

MR. RAINES: That's a pretty broad question, but Kirk here is from LANTDIV, and they handle basically the money that funds the CERCLA program down here.

MR. HUMPHRIES: We're getting our share, right?

MR. RAINES: Yeah.

MR. KIRK: We are. It doesn't really deal with the (inaudible) action, but Camp Lejeune, in the Atlantic division that we handle, is the largest customer that we service, and their program this year was around six and a half million dollars, which would be again next fiscal year the same amount. We can talk in more detail right after the meeting to answer specific questions.

MR. HUMPHRIES: Always worried about money.

MR. RAINES: We do get our share and we -- as one of the larger installations, I don't know if we get first cut off the top, but basically they're continuing funding our program. Anything else? We want to thank y'all for coming out. Hopefully, you learned something, and --

MR. BONELLI: Don't hesitate to call us with your questions.

The meeting was concluded at 8:05 p.m.

STATE OF NORTH CAROLINA )

) C-E-R-T-I-F-I-C-A-T-I-O-N

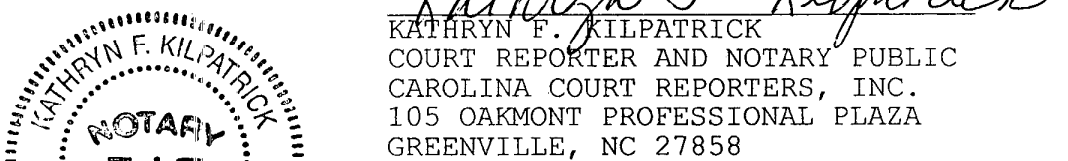
COUNTY OF LENOIR )

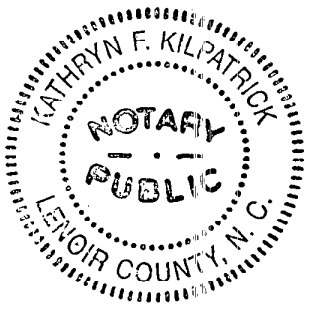
I, KATHRYN F. KILPATRICK, A COURT REPORTER AND NOTARY PUBLIC IN AND FOR THE AFORESAID COUNTY AND STATE, DO HEREBY CERTIFY THAT THE FOREGOING PAGES ARE AN ACCURATE TRANSCRIPT OF THE PUBLIC MEETING REGARDING THE PROPOSED REMEDIAL ACTION PLAN (PRAP) FOR OPERABLE UNITS (OUs) NO. 9 (SITE 65) AND NO. 17 (SITES 90, 91 AND 92), HELD ON JULY 18, 2001, IN JACKSONVILLE, NORTH CAROLINA, TRANSCRIBED BY ME PERSONALLY.

I FURTHER CERTIFY THAT I AM NOT FINANCIALLY INTERESTED IN THE OUTCOME OF THIS ACTION, A RELATIVE, EMPLOYEE, ATTORNEY OR COUNSEL OF ANY OF THE PARTIES, NOR A RELATIVE OR EMPLOYEE OF SUCH ATTORNEY OR COUNSEL.

WITNESS, MY HAND AND SEAL, THIS DATE: SEPTEMBER 18, 2001.

MY COMMISSION EXPIRES MAY 2, 2006.



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# APPENDIX C
# LETTER FROM TOXICOLOGIST, NORTH CAROLINA DEPARTMENT OF HEALTH AND HUMAN SERVICES

North Carolina
Department of Health and Human Services
Division of Epidemiology
P.O. Box 29601 • Raleigh, NC 27626-0601

James B. Hunt Jr., Governor

H. David Bruton, M.D., Secretary

January 28, 1998

Mr. Aaron Bernhardt, Environmental Scientist
Baker Environmental, Inc.
Airport Office Park, Building 3
420 Rouser Road
Coraopolis, Pennsylvania 15108

Dear Mr. Bernhardt:

I am writing in response to your request for a health risk evaluation of the analytical results of the fish and crab samples that were collected from Courthouse Pond and Powerline Pond at Site 65 and Courthouse Bay at Site 73. Based upon my review of these results, I offer the following health risk evaluation:

1. Methylene chloride, acetone, toluene, di-n-butyl phthalate, 2-butanone, and toluene were found in the fish and crab sampled from these two sites. Although elevated concentrations of methylene chloride and acetone were reported, all of these volatile organic chemicals are considered to be common laboratory contaminants (USEPA December 1989 *Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A).* Volatile organic chemicals typically do not bioconcentrate in fish and crab tissues because of their relatively low bioconcentration factors. Since all of these chemicals are common laboratory contaminants and volatile organic chemicals do not typically bioconcentrate in fish and crab tissues, these chemicals were most likely introduced into the samples in the laboratory. Based upon my review of the literature and the sampling data submitted, the concentrations measured for the above-mentioned chemicals are not likely to be representative of exposure concentrations.

2. The arsenic concentrations reported for fish and crab from these two sites were below the average levels typically reported for fish and seafood of 4 to 5 mg/kg (April 1993 *Toxicological Profile for Arsenic*, Agency for Toxic Substances and Disease Registry).

3. For Site 65, elevated DDD and DDE were reported in the whole body analysis of one bluegill. However, DDD and DDE were reported as nondetect or at very low concentrations for three composites of bluegill ( two fillet, 1 whole), two composites of

largemouth bass (one fillet, one whole), and three composites of redear sunfish (one fillet, two whole). Compared to fillet samples, higher DDD and DDE concentrations were found in the whole body samples. Since the whole body analysis includes analysis of both muscle and fatty tissues (where DDD and DDE can concentrate), higher levels would be expected to be reported in the whole body analysis. The DDD and DDE concentrations reported for all fish were below the average concentrations reported for the United States in 1984 of 60 ug/kg for DDD and 190 ug/kg for DDE (May 1994 *Toxicological Profile for 4,4'-DDT, 4,4'-DDE, 4,4'-DDD,* Agency for Toxic Substances and Disease Registry). The DDD and DDE concentrations reported in this one composite of bluegill do not appear to be representative of the average concentrations present in the edible portion of fish at this site.

4. For Site 65, elevated antimony and beryllium concentrations were found in the whole body samples for some fish, but were not detected in the fillet samples. Typically, low levels of antimony and beryllium are found in fish. According to the September 1992 *Toxicological Profile for Antimony* (Agency for Toxic Substances and Disease Registry), "Antimony does not appear to accumulate in fish and other aquatic animals". The antimony and beryllium detected in the whole fish analyses most likely came from the dirt or sediment that was present on the surface of the fish during analysis or from nonmuscular portions of the fish. The antimony and beryllium concentrations reported do not appear to be representative of the average concentrations present in the edible portion of fish at this site.

5. The remaining analyte concentrations were well within normal and acceptable concentrations.

In summary, the concentrations reported for these two sites may not be representative of the concentrations present in the edible portion of fish and crab found at this site. Based upon the information submitted by Baker Environmental, Inc., consumption of the fish and crab should not pose a significant health risk. Please do not hesitate to call me if you have any questions at 919-715-6429.

Sincerely,

Luanne K. Williams

Luanne K. Williams, Pharm.D., Toxicologist
Medical Evaluation and Risk Assessment Branch
Occupational and Environmental Epidemiology Section

LKW/rm